

HAWAIIAN
ANNUAL

1918-20

DU

621

.T53

[SS]

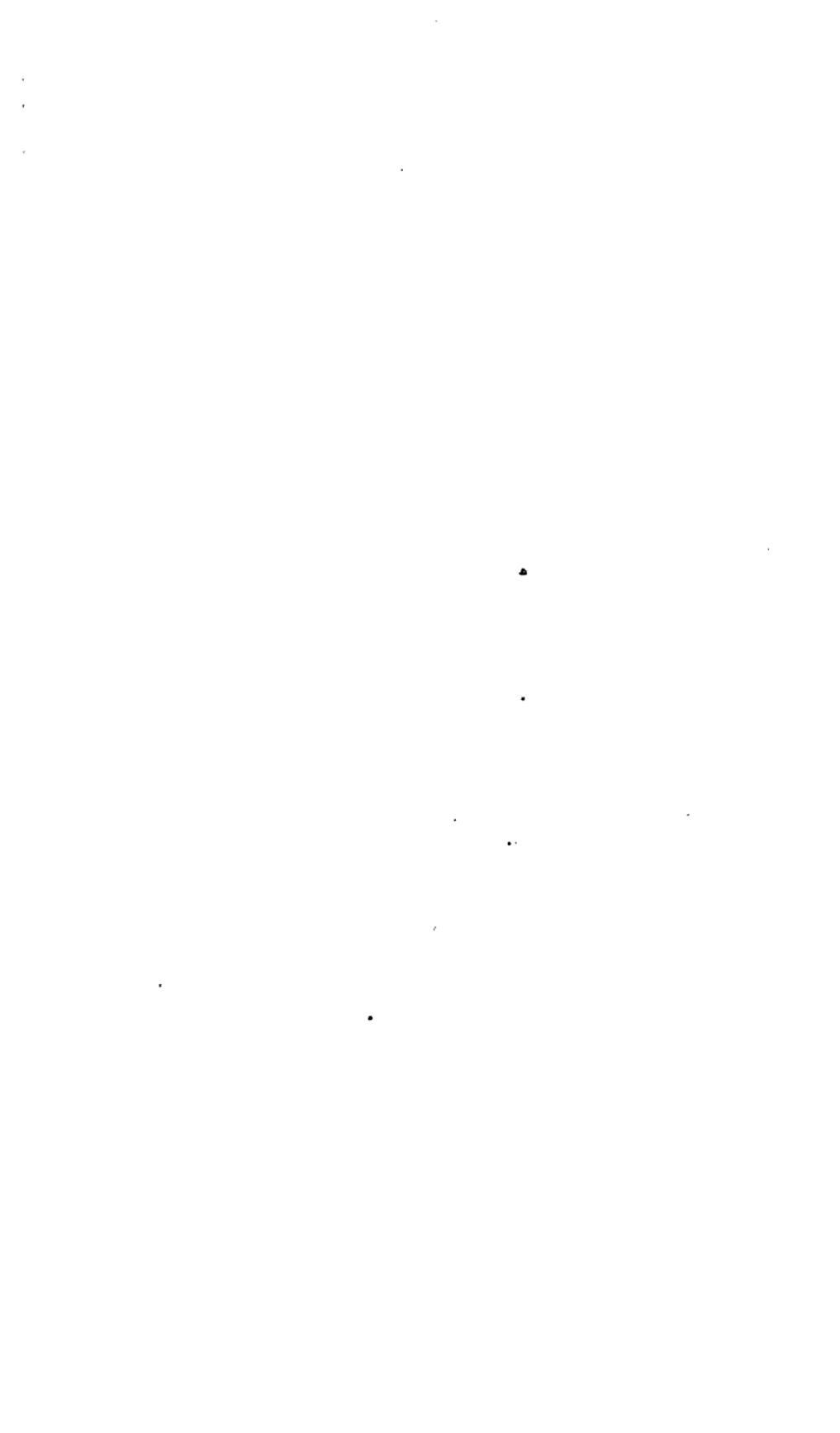
UNIV.
OF
MICH.



In Memory of
STEPHEN SPAULDING
CLASS OF 1927
UNIVERSITY OF MICHIGAN

W.H. Bicknell 1927

III
621
753



29 1923

THE HAWAIIAN ANNUAL

THE REFERENCE
BOOK OF HAWAII



Issued Regularly
since 1875

1875-1918

MAMENAKA

1918



THOS. G. THRUM
Publisher
Honolulu T.H.



SINGLE COPIES 75 CTS.

BY MAIL 85 CENTS

FORTY-FOURTH YEAR

OAHU RAILWAY & LAND CO.

HIIS COMPANY runs regularly to Kahuku, 7½ miles from Honolulu. The equipment of the road is first-class in every particular.

EXCURSION RATES are maintained from Saturday till Monday of each week. A delightful ride through varied and unsurpassed scenery makes excursions of the OAHU RAILWAY one of the most attractive features of the Islands, not only to the Tourist, but residents of Honolulu as well. The opportunity to visit a large Sugar Estate should not be missed by those visiting these Islands, and among others on the line of the Railway is the Ewa plantation, one of the largest in the Islands, or by the branch line to Wahiawa, eleven miles from Waipahu, inspect the extensive pineapple industry in that section, or, to Leilehua on the same branch, and visit Schofield Barracks, the principal post of the U. S. Army.



HALEIWA HOTEL
On Line of Oahu Railway

HALEIWA HOTEL.—At Waialua is a beautiful new Hotel, of the most modern construction and equipment, in which guests will find all possible comfort and entertainment, combined with elegance of furnishing, tropical surroundings and healthful atmosphere. The view from the Hotel embraces Sea, Mountain, and Valley in a combination not to be enjoyed elsewhere.

B. F. DILLINGHAM, President

G. P. DENISON,
General Manager.

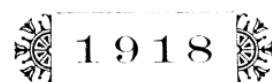
F. C. SMITH,
Gen'l Passenger & Ticket Agt.

Thrum's

HAWAIIAN

ALMANAC AND ANNUAL

FOR



1918

THE REFERENCE BOOK OF INFORMATION AND STATISTICS

Relating to the Territory of Hawaii, of Value to
Merchants, Tourists and Others

THOS. G. THRUM
Compiler and Publisher

Forty-Fourth Year of Publication

Copyright 1917 by Thos. G. Thrum

HONOLULU
1917

Counting House 1918 Calendar 1918

	SATURDAY	FRIDAY	WEDNESDAY	TUESDAY	MONDAY	SUNDAY	JULY	AUG.	SEPT.	OCT.	NOV.	DEC.	
JAN.	1 2 3 4 5	6 7 8 9 10	11 12 13 14 15	16 17 18 19 20	21 22 23 24 25	26 27 28 29 30	1 2 3 4 5	6 7 8 9 10	11 12 13 14 15	16 17 18 19 20	21 22 23 24 25	26 27 28 29 30	31
FEB.	3 4 5 6 7	8 9 10 11 12	13 14 15 16 17	18 19 20 21 22	23 24 25 26 27	28	1 2 3 4 5	6 7 8 9 10	11 12 13 14 15	16 17 18 19 20	21 22 23 24 25	26 27 28 29 30	31
MAR.	10 11 12 13 14	15 16 17 18 19	20 21 22 23 24	25 26 27 28 29	30	31	1 2 3 4 5	6 7 8 9 10	11 12 13 14 15	16 17 18 19 20	21 22 23 24 25	26 27 28 29 30	31
APR.	1 2 3 4 5	6 7 8 9 10	11 12 13 14 15	16 17 18 19 20	21 22 23 24 25	26 27 28 29 30	1 2 3 4 5	6 7 8 9 10	11 12 13 14 15	16 17 18 19 20	21 22 23 24 25	26 27 28 29 30	31
MAY	5 6 7 8 9	10 11 12 13 14	15 16 17 18 19	20 21 22 23 24	25 26 27 28 29	30	1 2 3 4 5	6 7 8 9 10	11 12 13 14 15	16 17 18 19 20	21 22 23 24 25	26 27 28 29 30	31
JUNE	2 3 4 5 6	7 8 9 10 11	12 13 14 15 16	17 18 19 20 21	22 23 24 25 26	27 28 29 30	1	2 3 4 5 6	7 8 9 10 11	12 13 14 15 16	17 18 19 20 21	22 23 24 25 26	27 28

Thos. G. Thrum
 RESEARCHER AND PUBLISHER
The Hawaiian Annual
 HONOLULU, HAWAII

Mr. Thomas M. Spruance

7-26-1923

Supplement to Main Book

SS1181 (Aug. 1928)

TABLE OF CONTENTS

CALENDARS, DISTANCES, ETC.

Pages

Holidays, Church Days, Eclipses, etc-----	6
Calendars—First, Second, Third and Fourth Quarters-----	7—10
Inter-Island Distances by Sea; Channel and Ocean Distances-----	11
Overland Distances: Oahu, Hawaii -----	12—13
" " Maui, Kauai -----	14
" " Molokai, Oahu Railway -----	15

STATISTICAL.

Area, Elevation and Coast Line Distances, Hawaiian Islands-----	15
Seating Capacity Principal Churches, Halls, Etc., Honolulu-----	15
Population by Districts and Islands, Comparative 1900-1910-----	16
by Age, Group, Sex and Race, 1910-----	16
of Honolulu and Hilo, Hawaii Census of 1910-----	17
Comparative Table of Population Hawaiian Islands, 1860-1910-----	17
Illiterates in Population, Territory of Hawaii-----	18
Population by Race and Sex, 1910-----	18
Estimated Population in Hawaii, 1917-----	18
Vital Statistics Territory of Hawaii, 1917-----	19
Births and Deaths, by Counties and Nationalities, 1917-----	19
Nationality of Plantation Labor, 1916-17-----	19
School Statistics, Territory of Hawaii, 1917-----	20
Value Domestic Merchandise Shipments to U. S., 1916 and 1917-----	21
Import Values from U. S., 1916 and 1917-----	22—23
Imports and Exports, Fiscal Year 1917-----	24
Quantity and Value Principal Articles Domestic Produce to U. S., 1917 -----	24
Summary of Insurance Business, 1916 -----	25
Number and Tonnage of Shipping, Entered and Cleared, 1917-----	25
Passengers from and to Hawaii, Fiscal Year 1917-----	26
Hawaiian Sugar Export Statistics, 1901-1917-----	26
Hawaii's Annual Trade Balance from 1901-----	27
Table Receipts, Expenditures and Public Debt, 1901-1917-----	27
Bonded Debt, June 30, 1917-----	27
Assessed Value Real and Personal Property, 1917-----	28
Hawaiian Corporations, Number and Capital, 1917-----	28
Growth of Bank Deposits, 1907-1917-----	28
Taxes by Divisions and Counties, Fiscal Year 1917-----	29
Table of Rainfall Throughout the Islands, 1916-17-----	30—31
Summary of Meteorological Observations, 1916-17 -----	32
Hawaiian Sugar Crops, 1912-17-----	182—183

M.T.

ARTICLES.

	Pages
Commercial Review -----	33— 36
The Hawaiian Pineapple Industry -----	36— 46
Hawaii's Agricultural Strength and Weakness-----	47— 50
Hawaii in War Time-----	51— 59
The Red Cross in Hawaii-----	59— 62
Early Days in the Reign of Kamehameha IV-----	63— 73
Some Plantation Memories -----	74— 82
Kona Conditions -----	83— 86
Hibiscus Development in Hawaii -----	86— 89
Child Welfare Movement -----	89— 93
The Passing of Kamehameha I-----	94—101
Death, Lying-in-State and Obsequies of Queen Liliuokalani-----	102—109
Hawaiian Volcano Observations -----	110—120
Must We Countenance the Hula-----	120—125
More Mati Heiau Sites -----	125—128
Sowing Seed of Wage Discontent-----	128
The Algae of the Hawaiian Archipelago-----	129—155
Retrospect for 1917 -----	155—177
Meaning of Some Place-Names -----	177—179
Interesting Phenomena, 1918 -----	179
New Lava Terms -----	179

REFERENCE.

Table of Pineapple Crops, Export Values, Companies and Agencies, inset at -----	page	46
List of Sugar Plantations, Mills and Agencies -----	180—181	
Register and Directory, Territorial Officials-----	184—196	
County Officials -----	197	
Federal Officials -----	197—199	
Index -----	200—201	

INDEX TO ADVERTISERS

Page		Page	
Alexander & Baldwin, Sugar Factors -----	2	Honolulu Construc. & Draying Co. -----	4
Allen & Robinson, Lumber, Etc. -----	7	Honolulu Iron Works Co. -----	9
Axtell's Mausoleums -----	21	Hustace-Peck Co., Draymen-----	20
Bank of Hawaii, Ltd.-----	3d cover	Kueffer & Hall, Engrvrs. -----	18
Bank of Honolulu, Ltd.-----	8	Laniakea, Luncheons -----	23
Benson, Smith & Co., Drgsts---	13	Lewers & Cooke, Ltd., Lumber ----- (on back)	
Bergstrom Music Co., Pianos, Etc. -----	18	The Liverpool & London & Gl. Ins. Co. -----	5
Bishop & Co., Bankers-----	4	May & Co., Grocers, Etc. -----	16
Brewer & Co., Ship'g & Com. -----	1	McInerny, Ltd., M. -----	17
Castle & Cooke, Ship'g & Com. -----	3	Mercantile Printing Co. -----	16
Catton, Neill & Co., Machsts---	13	North Brit. & Metl. Ins. Co. --	5
Chambers Drug Co., Ltd.-----	11	Oahu Railway & Land Co.----- ----- 2d page cover	
Cherry, The, Japanese Goods---	22	Office Supply Co. -----	17
Chinese-American Bank, Ltd.-----	4	Sachs Dry Goods Co.-----	17
Davies & Co., Theo. H., Import- ers & Com. -----	7	Schaefer & Co., F. A., Import- ers & Com. -----	7
Dimond & Co., W. W. -----	23	Silva's Toggery -----	20
Dowsett, J. M., Fire Ins. -----	22	Sun Ins. Office of London-----	5
Ehlers & Co., Dry Goods, etc---	21	Thames & Mersey Mar. Ins Co. -----	6
Fidelity & Deposit Co. of Md. -----	6	Thrum's, Ltd., Stationery, Books, etc. -----	25
Fireman's Fund Ins. Company -----	6	Von Hamm-Young Co., Imptrs. -----	15
First Ntnl. Bank of Hawaii----	14	Waldron, Ltd., Fred L., Com- mission----- 4th page cover	
First Trust Co. of Hilo-----	15	Waterhouse Office Outfitting Co., The ----- 3d page cover	
Guardian Trust Co. -----	17	Waterhouse Tr Co., Henry-----	12
Hackfeld & Co., Ship'g & Com. -----	10	Yokohama Specie Bank-----	20
Hall & Son, E. O., Hdw., Etc. -----	11		
Hawaiian Annual -----	23		
Hawaiian Electric Co. -----	19		
Hawaiian Fertilizer Co. -----	18		
Hawaiian Trust Co. -----	14		
Hawaii Meat Co. -----	22		
Hollister Drug Co. -----	16		

HAWAIIAN ANNUAL CALENDAR FOR 1918.

Second half of the twentieth year and first half of the twenty-first year since annexation of Hawaii with the United States.

Twenty-third year since the downfall of the Monarchy.

The 140th year since the discovery of the Hawaiian Islands by Captain Cook.

Holidays Observed at the Hawaiian Islands.

*New Year	Jan. 1	*Birthday Hawn. Republic.	July 4
Chinese New Year	Feb. 10	*American Anniversary ..	July 4
Lincoln's Birthday	Feb. 12	Labor Day (1st Monday) ..	Sept. 2
*Washington's Birthday	Feb. 22	*Regatta Day (3d Saturday) ..	Sept. 21
*Decoration Day	May 30	Thanksgiving Day	Nov. 28
Kamehameha Day	June 11	*Christmas Day	Dec. 25

* Those distinguished by the asterisk have been established by law.

Church Days.

Epiphany	Jan. 6	Ascension Day	May 9
Ash Wednesday	Feb. 13	Whit Sunday	May 19
First Sunday in Lent	Feb. 17	Trinity Sunday	May 26
Palm Sunday	Mch. 24	Corpus Christi	May 30
Good Friday	Mch. 29	Advent Sunday	Dec. 1
Easter Sunday	Mch. 31	Christmas	Dec. 25

Eclipses in 1918.

Courtesy of E. H. Bryan, Jr., College of Hawaii.

During the year 1918 there will be three eclipses, two of the Sun and one of the Moon, as follows:—

I. Total eclipse of the Sun June 8, visible in the Hawaiian Islands as a partial eclipse.

Beginning of the eclipse.....10:31 A.M.

Middle of the eclipse11:13 A.M.

Ending of the eclipse12:00 noon

Magnitude of the eclipse at Honolulu, 0.09.

Note: The path of the total eclipse will pass across the United States, from Washington to Florida, through Denver, Colorado.

II. Partial eclipse of the moon, June 23-24, visible in the Hawaiian Islands, June 24.

Moon enters shadow.....12h. 51m. 46s. A.M.

Middle of the eclipse12h. 52m. 28s. A.M.

Moon leaves shadow12h. 53m. 10s. A.M.

Duration of the eclipse1m. 24s.

Magnitude of eclipse, 0.135, Moon's diameter—1.00

III. Annular eclipse of the sun December 3, invisible in the Hawaiian Islands.

FIRST QUARTER, 1918

JANUARY		FEBRUARY		MARCH	
D.	H. M.	D.	H. M.	D.	H. M.
5 Last Quar.	1.19 6 a.m.	3 Last Quar.	9.22,0 p.m.	5 Last Quar.	2.13,6 p.m.
12 New Moon	0.05,8 p.m.	10 New Moon	11.34,6 p.m.	12 New Moon	9.22,4 a.m.
19 First Quar.	4.07,9 a.m.	17 First Quar.	2.26,9 p.m.	19 First Quar.	3.00,4 a.m.
26 Full Moon	4.44,2 p.m.	25 Full Moon	11.04,6 a.m.	27 Full Moon	5.02,8 a.m.
Sun Sets		Sun Rises		Sun Sets	
Sun Rises		Day of Wk		Sun Rises	
Day of Mo		Day of Mo		Day of Mo	
Day of Mo	H. M.	H. M.	H. M.	H. M.	H. M.
1 Tues.	6 38 15 30 1	1 Fri . . .	6 37 45 50 6	1 Fri . . .	6 20 36 4 7
2 Wed.	6 38 45 30 7	2 Sat . . .	6 37 05 51 3	2 Sat . . .	6 19 56 5 0
3 Thurs	6 38 75 31 4	3 SUN . . .	6 36 65 51 9	3 SUN . . .	6 18 76 5 4
4 Fri . . .	6 38 95 32 1	4 Mon . . .	6 36 25 52 5	4 Mon . . .	6 17 96 5 8
5 Sat . . .	6 39 15 32 8	5 Tues . . .	6 35 75 53 1	5 Tues . . .	6 17 06 6 2
6 SUN . . .	6 39 35 33 4	6 Wed . . .	6 35 35 53 7	6 Wed . . .	6 16 26 6 6
7 Mon . . .	6 39 55 34 1	7 Thurs . . .	6 34 85 54 2	7 Thurs . . .	6 15 46 6 9
8 Tues . . .	6 39 75 34 8	8 Fri . . .	6 34 35 54 8	8 Fri . . .	6 14 56 7 3
9 Wed . . .	6 39 95 35 5	9 Sat . . .	6 33 85 55 3	9 Sat . . .	6 13 76 7 7
10 Thurs . . .	6 40 15 36 2	10 SUN . . .	6 33 25 55 8	10 SUN . . .	6 12 86 8 0
11 Fri . . .	6 40 25 36 9	11 Mon . . .	6 32 85 56 3	11 Mon . . .	6 11 96 8 4
12 Sat . . .	6 40 35 37 5	12 Tues . . .	6 32 25 56 8	12 Tues . . .	6 11 06 8 7
13 SUN . . .	6 40 45 38 2	13 Wed . . .	6 31 65 57 3	13 Wed . . .	6 10 16 9 0
14 Mon . . .	6 40 45 38 9	14 Thurs . . .	6 31 05 57 9	14 Thurs . . .	6 9 26 9 3
15 Tues . . .	6 40 45 39 6	15 Fri . . .	6 30 45 58 4	15 Fri . . .	6 8 36 9 7
16 Wed . . .	6 40 45 40 3	16 Sat . . .	6 29 85 58 9	16 Sat . . .	6 7 46 10 0
17 Thurs . . .	6 40 45 40 9	17 SUN . . .	6 29 15 59 4	17 SUN . . .	6 6 56 10 3
18 Fri . . .	6 40 35 41 6	18 Mon . . .	6 28 56 59 9	18 Mon . . .	6 5 66 10 6
19 Sat . . .	6 40 35 42 3	19 Tues . . .	6 27 86 0 4	19 Tues . . .	6 4 76 10 9
20 SUN . . .	6 40 25 43 0	20 Wed . . .	6 27 16 0 9	20 Wed . . .	6 3 86 11 2
21 Mon . . .	6 40 15 43 6	21 Thurs . . .	6 26 56 1 3	21 Thurs . . .	6 2 96 11 6
22 Tues . . .	6 39 95 44 3	22 Fri . . .	6 25 86 1 8	22 Fri . . .	6 2 06 11 9
23 Wed . . .	6 39 85 45 0	23 Sat . . .	6 25 16 2 2	23 Sat . . .	6 1 16 12 2
24 Thurs . . .	6 39 65 45 7	24 SUN . . .	6 24 36 2 6	24 SUN . . .	6 0 16 12 5
25 Fri . . .	6 39 45 46 3	25 Mon . . .	6 23 56 3 0	25 Mon . . .	5 59 26 12 8
26 Sat . . .	6 39 25 46 9	26 Tues . . .	6 22 76 3 4	26 Tues . . .	5 58 36 13 1
27 SUN . . .	6 39 05 47 5	27 Wed . . .	6 21 96 3 8	27 Wed . . .	5 57 36 13 4
28 Mon . . .	6 38 75 48 1	28 Thurs . . .	6 21 16 4 2	28 Thurs . . .	5 56 46 13 7
29 Tues . . .	6 38 45 48 8			29 Fri . . .	5 55 56 14 0
30 Wed . . .	6 38 05 49 4			30 Sat . . .	5 54 66 14 4
31 Thurs . . .	6 37 75 50 0			31 SUN . . .	5 53 76 14 7

VOLCANO OF KILAUEA, ISLAND OF HAWAII.

Corrected for Deflection of the Vertical.

Area, 4.14 square miles, or 2,650 acres.
 Circumference, 41,500 feet, or 7.85 miles.
 Extreme width, 10,300 feet, or 1.95 miles.
 Extreme length, 15,500 feet, or 2.93 miles.
 Elevation, Volcano House, 4,000 feet.

SECOND QUARTER, 1918

APRIL				MAY				JUNE			
D.	H. M.			D.	H. M.			D.	H. M.		
4 Last Quar.	3.03.1	a.m.		3 Last Quar.	11.56.2	a.m.		1 Last Quar.	5.50.0	p.m.	
10 New Moon	6.04.3	p.m.		10 New Moon	2.30.9	a.m.		8 New Moon	11.32.7	a.m.	
17 First Quar	5.37.7	p.m.		17 First Quar	9.44.3	a.m.		16 First Quar.	2.41.7	a.m.	
25 Full Moon	9.35.4	p.m.		25 Full Moon	0.02.4	p.m.		24 Full Moon	0.08.3	a.m.	
Sun Rises . . .	H. M.	H. M.	Sun Sets . . .	Sun Rises . . .	H. M.	H. M.	Sun Sets . . .	Sun Rises . . .	H. M.	H. M.	Sun Sets . . .
Day of Mo. . .	Day of Wk. . .	Day of Mo. . .	Day of Wk. . .	Day of Mo. . .	Day of Wk. . .	Day of Mo. . .	Day of Wk. . .	Day of Mo. . .	Day of Wk. . .	Day of Mo. . .	Day of Wk. . .
1 Mon. . .	5 52 86 15 0	1 Wed. . .	5 28 86 25 2	1 Sat. . .	5 17 26 38 2	1 Mon. . .	5 17 16 39 0	1 Sat. . .	5 17 26 38 2	1 Mon. . .	5 17 16 39 0
2 Tues. . .	5 51 96 15 3	2 Thurs. . .	5 28 26 25 6	2 SUN. . .	5 17 16 38 6	2 Tues. . .	5 17 06 39 4	2 SUN. . .	5 17 16 38 6	2 Tues. . .	5 17 06 39 4
3 Wed. . .	5 51 06 15 6	3 Fri. . .	5 27 66 26 0	3 Mon. . .	5 17 16 39 0	3 Mon. . .	5 17 16 39 0	3 Mon. . .	5 17 16 39 0	3 Mon. . .	5 17 16 39 0
4 Thurs. . .	5 50 16 16 0	4 Sat. . .	5 27 06 26 4	4 Tues. . .	5 17 06 39 4	4 Tues. . .	5 17 06 39 4	4 Tues. . .	5 17 06 39 4	4 Tues. . .	5 17 06 39 4
5 Fri. . .	5 49 26 16 3	5 SUN. . .	5 26 46 26 8	5 Wed. . .	5 17 06 39 8	5 Wed. . .	5 17 06 39 8	5 Wed. . .	5 17 06 39 8	5 Wed. . .	5 17 06 39 8
6 Sat. . .	5 48 36 16 6	6 Mon. . .	5 25 86 27 2	6 Thurs. . .	5 17 06 40 1	6 Thurs. . .	5 17 06 40 1	6 Thurs. . .	5 17 06 40 1	6 Thurs. . .	5 17 06 40 1
7 SUN. . .	5 47 46 16 9	7 Tues. . .	5 25 36 27 6	7 Fri. . .	5 17 06 40 5	7 Fri. . .	5 17 06 40 5	7 Fri. . .	5 17 06 40 5	7 Fri. . .	5 17 06 40 5
8 Mon. . .	5 46 56 17 2	8 Wed. . .	5 24 76 28 0	8 Sat. . .	5 16 96 40 9	8 Sat. . .	5 16 96 40 9	8 Sat. . .	5 16 96 40 9	8 Sat. . .	5 16 96 40 9
9 Tues. . .	5 45 66 17 5	9 Thurs. . .	5 24 36 28 5	9 SUN. . .	5 16 96 41 2	9 SUN. . .	5 16 96 41 2	9 SUN. . .	5 16 96 41 2	9 SUN. . .	5 16 96 41 2
10 Wed. . .	5 44 86 17 8	10 Fri. . .	5 23 86 28 9	10 Mon. . .	5 17 06 41 5	10 Mon. . .	5 17 06 41 5	10 Mon. . .	5 17 06 41 5	10 Mon. . .	5 17 06 41 5
11 Thurs. . .	5 44 06 18 1	11 Sat. . .	5 23 46 29 3	11 Tues. . .	5 17 16 41 9	11 Tues. . .	5 17 16 41 9	11 Tues. . .	5 17 16 41 9	11 Tues. . .	5 17 16 41 9
12 Fri. . .	5 43 26 18 4	12 SUN. . .	5 22 96 29 2	12 Wed. . .	5 17 26 42 2	12 Wed. . .	5 17 26 42 2	12 Wed. . .	5 17 26 42 2	12 Wed. . .	5 17 26 42 2
13 Sat. . .	5 42 36 18 8	13 Mon. . .	5 22 46 30 6	13 Thurs. . .	5 17 36 42 5	13 Thurs. . .	5 17 36 42 5	13 Thurs. . .	5 17 36 42 5	13 Thurs. . .	5 17 36 42 5
14 SUN. . .	5 41 56 19 1	14 Tues. . .	5 22 06 30 0	14 Fri. . .	5 17 56 42 8	14 Fri. . .	5 17 56 42 8	14 Fri. . .	5 17 56 42 8	14 Fri. . .	5 17 56 42 8
15 Mon. . .	5 40 76 19 4	15 Wed. . .	5 21 66 31 4	15 Sat. . .	5 17 66 43 1	15 Sat. . .	5 17 66 43 1	15 Sat. . .	5 17 66 43 1	15 Sat. . .	5 17 66 43 1
16 Tues. . .	5 39 96 19 8	16 Thurs. . .	5 21 6 31 9	16 SUN. . .	5 17 76 43 4	16 SUN. . .	5 17 76 43 4	16 SUN. . .	5 17 76 43 4	16 SUN. . .	5 17 76 43 4
17 Wed. . .	5 39 06 20 1	17 Fri. . .	5 20 86 31 3	17 Mon. . .	5 18 96 43 6	17 Mon. . .	5 18 96 43 6	17 Mon. . .	5 18 96 43 6	17 Mon. . .	5 18 96 43 6
18 Thurs. . .	5 38 26 20 5	18 Sat. . .	5 20 56 32 7	18 Tues. . .	5 18 06 43 9	18 Tues. . .	5 18 06 43 9	18 Tues. . .	5 18 06 43 9	18 Tues. . .	5 18 06 43 9
19 Fri. . .	5 37 46 20 8	19 SUN. . .	5 20 26 32 1	19 Wed. . .	5 18 26 44 1	19 Wed. . .	5 18 26 44 1	19 Wed. . .	5 18 26 44 1	19 Wed. . .	5 18 26 44 1
20 Sat. . .	5 36 66 21 2	20 Mon. . .	5 19 86 33 6	20 Thurs. . .	5 18 46 44 4	20 Thurs. . .	5 18 46 44 4	20 Thurs. . .	5 18 46 44 4	20 Thurs. . .	5 18 46 44 4
21 SUN. . .	5 35 86 21 5	21 Tues. . .	5 19 56 33 0	21 Fri. . .	5 18 66 44 6	21 Fri. . .	5 18 66 44 6	21 Fri. . .	5 18 66 44 6	21 Fri. . .	5 18 66 44 6
22 Mon. . .	5 35 06 21 9	22 Wed. . .	5 19 26 34 4	22 Sat. . .	5 19 86 44 7	22 Sat. . .	5 19 86 44 7	22 Sat. . .	5 19 86 44 7	22 Sat. . .	5 19 86 44 7
23 Tues. . .	5 34 36 22 3	23 Thurs. . .	5 18 86 34 8	23 SUN. . .	5 19 16 44 9	23 SUN. . .	5 19 16 44 9	23 SUN. . .	5 19 16 44 9	23 SUN. . .	5 19 16 44 9
24 Wed. . .	5 33 66 22 6	24 Fri. . .	5 18 56 35 4	24 Mon. . .	5 19 46 45 1	24 Mon. . .	5 19 46 45 1	24 Mon. . .	5 19 46 45 1	24 Mon. . .	5 19 46 45 1
25 Thurs. . .	5 32 96 23 0	25 Sat. . .	5 18 36 35 1	25 Tues. . .	5 19 66 45 2	25 Tues. . .	5 19 66 45 2	25 Tues. . .	5 19 66 45 2	25 Tues. . .	5 19 66 45 2
26 Fri. . .	5 32 26 23 3	26 SUN. . .	5 18 16 35 8	26 Wed. . .	5 19 96 45 4	26 Wed. . .	5 19 96 45 4	26 Wed. . .	5 19 96 45 4	26 Wed. . .	5 19 96 45 4
27 Sat. . .	5 31 46 23 7	27 Mon. . .	5 17 96 36 2	27 Thurs. . .	5 20 26 45 5	27 Thurs. . .	5 20 26 45 5	27 Thurs. . .	5 20 26 45 5	27 Thurs. . .	5 20 26 45 5
28 SUN. . .	5 30 86 24 1	28 Tues. . .	5 17 76 36 6	28 Fri. . .	5 20 56 45 6	28 Fri. . .	5 20 56 45 6	28 Fri. . .	5 20 56 45 6	28 Fri. . .	5 20 56 45 6
29 Mon. . .	5 30 16 24 5	29 Wed. . .	5 17 56 37 0	29 Sat. . .	5 20 86 45 7	29 Sat. . .	5 20 86 45 7	29 Sat. . .	5 20 86 45 7	29 Sat. . .	5 20 86 45 7
30 Tues. . .	5 29 56 24 9	30 Thur. . .	5 17 46 37 4	30 SUN. . .	5 21 16 45 8	30 SUN. . .	5 21 16 45 8	30 SUN. . .	5 21 16 45 8	30 SUN. . .	5 21 16 45 8
31 Fri. . .	5 17 36 37 8										

MOKUAWEOWEO.

The Summit Crater of Mauna Loa, Island of Hawaii.

Area, 3.70 square miles, or 2,370 acres.

Circumference, 50,000 feet, or 9.47 miles.

Length, 19,500 feet, or 3.7 miles.

Width, 9.20 feet, or 1.74 miles. Elevation of summit, 13,675 feet.

THIRD QUARTER, 1918

JULY			AUGUST			SEPTEMBER		
D.	H. M.		D.	H. M.		D.	H. M.	
7 New Moon	9 52.1 p.m.		9 Full Moon	9 59.6 a.m.		5 New Moon	0 13.7 a.m.	
15 First Quar.	7 54.7 p.m.		14 First Quar.	0 46.4 p.m.		13 First Quar.	4 32.3 a.m.	
23 Full Moon	10 04.8 a.m.		21 Full Moon	6 32.3 p.m.		20 Full Moon	2 30.9 a.m.	
30 Last Quar.	2 43.9 a.m.		28 Last Quar.	8 57.1 a.m.		26 Last Quar.	6 08.6 p.m.	
Day of Mo... .	Sun Rises... .	Sun Sets... .	Day of Mo... .	Sun Rises... .	Sun Sets... .	Day of Mo... .	Sun Rises... .	Sun Sets... .
Day of Wk... .			Day of Wk... .			Day of Wk... .		
1 Mon..	5 21 46 45 8		1 Thurs	5 33 06 38 5		1 SUN.	5 43 46 15 7	
2 Tues..	5 21 76 45 8		2 Fri... .	5 33 76 38 0		2 Mon..	5 43 76 14 8	
3 Wed..	5 22 16 45 9		3 Sat... .	5 34 16 37 4		3 Tues.	5 43 96 13 9	
4 Thurs..	5 22 46 45 8		4 SUN..	5 34 46 36 9		4 Wed..	5 44 26 13 0	
5 Fri... .	5 22 86 45 8		5 Mon..	5 34 86 36 3		5 Thurs	5 44 56 12 0	
6 Sat... .	5 23 16 45 8		6 Tues.	5 35 26 35 7		6 Fri... .	5 44 76 11 1	
7 SUN.	5 23 56 45 8		7 Wed..	5 35 66 35 1		7 Sat... .	5 45 06 10 2	
8 Mon..	5 23 86 45 7		8 Thurs	5 36 96 34 5		8 SUN.	5 45 36 9 2	
9 Tues..	5 24 26 45 6		9 Fri... .	5 36 36 33 8		9 Mon..	5 45 56 8 3	
10 Wed..	5 24 56 45 5		10 Sat... .	5 36 66 33 2		10 Tues.	5 45 86 7 3	
11 Thurs..	5 24 96 45 4		11 SUN.	5 37 06 32 5		11 Wed..	5 46 06 6 4	
12 Fri... .	5 25 46 45 3		12 Mon..	5 37 36 31 8		12 Thurs	5 46 36 5 4	
13 Sat... .	5 25 86 45 1		13 Tues.	5 37 76 31 1		13 Fri... .	5 46 56 4 4	
14 SUN.	5 26 26 44 9		14 Wed..	5 38 06 30 4		14 Sat... .	5 46 86 3 5	
15 Mon..	5 26 66 44 7		15 Thurs	5 38 36 29 7		15 SUN.	5 47 06 2 5	
16 Tues..	5 27 06 44 5		16 Fri... .	5 38 76 29 0		16 Mon..	5 47 36 1 6	
17 Wed..	5 27 46 44 3		17 Sat... .	5 39 06 28 2		17 Tues.	5 47 56 0 6	
18 Thurs..	5 27 86 44 1		18 SUN.	5 39 36 27 5		18 Wed..	5 47 85 59 7	
19 Fri... .	5 28 26 43 8		19 Mon..	5 39 66 26 7		19 Thurs	5 48 05 58 7	
20 Sat... .	5 28 66 43 5		20 Tues.	5 39 96 25 9		20 Fri... .	5 48 35 57 8	
21 SUN.	5 29 06 43 2		21 Wed..	5 40 36 25 1		21 Sat... .	5 48 55 56 8	
22 Mon..	5 29 46 42 8		22 Thurs	5 40 66 24 3		22 SUN.	5 48 85 55 9	
23 Tues..	5 29 86 42 5		23 Fri... .	5 40 96 23 5		23 Mon..	5 49 05 54 9	
24 Wed..	5 30 26 42 1		24 Sat... .	5 41 26 22 6		24 Tues.	5 49 35 53 9	
25 Thurs..	5 30 66 41 7		25 SUN.	5 41 46 21 8		25 Wed..	5 49 65 53 0	
26 Fri... .	5 31 06 41 3		26 Mon..	5 41 76 20 9		26 Thurs	5 49 85 52 1	
27 Sat... .	5 31 46 40 9		27 Tues.	5 42 06 20 1		27 Fri... .	5 50 15 51 1	
28 SUN.	5 31 86 40 5		28 Wed..	5 42 36 19 2		28 Sat... .	5 50 45 50 2	
29 Mon..	5 32 26 40 0		29 Thurs	5 42 66 18 3		29 SUN.	5 50 75 49 2	
30 Tues..	5 32 56 39 5		30 Fri... .	5 42 96 17 4		30 Mon..	5 51 05 48 3	
31 Wed..	5 32 96 39 0		31 Sat... .	5 43 26 16 6				

IAO VALLEY, ISLAND OF MAUI.

Length (from Wailuku), about 5 miles.

Width of Valley, 2 miles.

Depth, near head, 4,000 feet.

Elevation of Puu Kukui, above head of Valley, 5,700 feet.

Elevation of Crater of Eke, above Waihee Valley, 4,500 feet.

FOURTH QUARTER, 1918.

OCTOBER			NOVEMBER			DECEMBER		
D.	H. M.		D.	H. M.		D.	H. M.	
Sun Rises . . .	Sun Sets . . .		Sun Rises . . .	Sun Sets . . .		Sun Rises . . .	Sun Sets . . .	
Day of Mo. . .	Day of Wk. . .		Day of Mo. . .	Day of Wk. . .		Day of Mo. . .	Day of Wk. . .	
1 Tues.	5 51 35 47 4		1 Fri....	6 3 35 23 9		1 SUN.	6 21 55 17 3	
2 Wed..	5 51 65 46 5		2 Sat....	6 3 85 23 3		2 Mon..	6 22 25 17 4	
3 Thurs	5 51 85 45 6		3 SUN.	6 4 35 22 8		3 Tues.	6 22 85 17 5	
4 Fri....	5 52 15 44 7		4 Mon..	6 4 95 22 4		4 Wed..	6 23 55 17 7	
5 Sat...	5 52 45 43 8		5 Tues.	6 5 45 21 9		5 Thurs	6 24 25 17 9	
6 SUN.	5 52 75 42 9		6 Wed..	6 0 5 21 4		6 Fri....	6 24 85 18 1	
7 Mon..	5 53 15 42 0		7 Thurs	6 6 55 21 0		7 Sat....	6 25 45 18 4	
8 Tues.	5 53 45 41 1		8 Fri....	6 7 15 20 7		8 SUN.	6 26 05 18 7	
9 Wed..	5 53 85 40 2		9 Sat...	6 7 65 20 2		9 Mon..	6 26 65 19 0	
10 Thurs	5 54 15 39 4		10 SUN.	6 8 25 19 9		10 Tues.	6 27 35 19 3	
11 Fri....	5 54 55 38 6		11 Mon..	6 8 95 19 5		11 Wed..	6 27 95 19 6	
12 Sat...	5 54 85 37 7		12 Tues.	6 9 55 19 2		12 Thurs	6 28 55 19 9	
13 SUN.	5 55 15 36 9		13 Wed..	6 10 15 18 9		13 Fri....	6 29 15 20 3	
14 Mon..	5 55 55 36 1		14 Thurs	6 10 75 18 6		14 Sat...	6 29 75 20 6	
15 Tues.	5 55 85 35 3		15 Fri....	6 11 35 18 3		15 SUN.	6 30 35 21 0	
16 Wed..	5 56 25 34 5		16 Sat...	6 11 95 18 0		16 Mon..	6 30 85 21 4	
17 Thurs	5 56 65 33 7		17 SUN.	6 12 55 17 8		17 Tues.	6 31 45 21 9	
18 Fri....	5 56 95 32 9		18 Mon..	6 13 15 17 6		18 Wed..	6 31 95 22 3	
19 Sat...	5 57 35 32 2		19 Tues.	6 13 75 17 4		19 Thurs	6 32 55 22 8	
20 SUN.	5 57 75 31 4		20 Wed..	6 14 35 17 2		20 Fri....	6 33 05 23 3	
21 Mon..	5 58 25 30 7		21 Thurs	6 15 05 17 1		21 Sat...	6 33 55 23 8	
22 Tues.	5 58 65 30 0		22 Fri....	6 15 75 17 1		22 SUN.	6 34 05 24 3	
23 Wed..	5 59 15 29 3		23 Sat...	6 16 35 17 0		23 Mon..	6 34 55 24 8	
24 Thurs	5 59 55 28 7		24 SUN.	6 17 05 17 0		24 Tues.	6 35 05 25 3	
25 Fri....	6 0 05 28 0		25 Mon..	6 17 65 17 0		25 Wed..	6 35 55 25 9	
26 Sat...	6 0 45 27 4		26 Tues.	6 18 25 17 0		26 Thurs	6 35 95 26 5	
27 SUN.	6 0 95 26 7		27 Wed..	6 18 95 17 0		27 Fri....	6 36 35 27 0	
28 Mon..	6 1 45 26 1		28 Thurs	6 19 65 17 1		28 Sat...	6 36 65 27 6	
29 Tues.	6 1 85 25 5		29 Fri...	6 20 25 17 1		29 SUN.	6 37 05 28 2	
30 Wed..	6 2 35 24 9		30 Sat ...	6 20 95 17 2		30 Mon..	6 37 35 28 8	
31 Thurs	6 2 85 24 4					31 Tues.	6 37 75 28 4	

HALEAKALA, ISLAND OF MAUI.
The great Crater of Maui, the largest in the world.

Area, 19 square miles, or 12,160 acres.

Circumference, 105,600 feet, or 20 miles.

Extreme width, 2.37 miles.

Extreme length, 39,500 feet, or 7.48 miles.

Elevation to summit, 10,032 feet.

Elevation of principal cones in crater, 8,032 and 1,572 feet.

Elevation of cave in floor of crater, 7,380 feet.

INTER-ISLAND DISTANCES BY SEA IN SEA MILES.

AROUND OAHU FROM HONOLULU—ESPLANADE WHARF TO

	Miles.		Miles.
Bell Buoy	1 1/4	Pearl River Bar.....	6
Diamond Head	5	Barber's Point	15
Koko Head	12	Waianae Anchorage	26
Makapuu Point	16	Kaena Point, N. W. of Oahu.....	36
Mokapu	27	Waialua Anchorage	46
Kahuku North Point.....	48	Kahuku N. Pt., Oahu, via Kaena.	58

HONOLULU TO

Lae o ka Laau, S. W. Pt. Molokai	35	Mahukona, Hawaii.....	134
Kalaupapa, Leper Settlement..	52	Kawaihae, "	144
West Point of Lanai.....	50	Kealakekua, " (direct)	157
Lahaina, Maui.....	72	S. W. Pt. "	233
Kahului, "	90	Punaluu, "	250
Hana, "	128	Hilo, " (direct)	192
Maalaea, "	86	" " (windward)	206
Makena, "	96	" " (via Kawai-hae)	230

HONOLULU TO

Nawiliwili, Kauai.....	98	Hanalei, Kauai	125
Koloa, "	102	Niihau	144
Waimea, "	120		

LAHAINA, MAUI, TO

Kaluaaha, Molokai	17	Maalaea, Maui	12
Lanai	9	Makena, Maui	18

KAWAIHAE, HAWAII, TO

Mahukona, Hawaii	10	Hilo, Hawaii	85
Waipio, Hawaii	37	Lae o ka Mano, Hawaii.....	20
Honokaa, Hawaii	45	Kailua, Hawaii	34
Laupahoehoe, Hawaii	62	Kealakekua, Hawaii	44

HILO, HAWAII, TO

East Point of Hawaii.....	20	Punaluu, Hawaii	70
Keauhou, Kau, Hawaii.....	50	Kaalualu, Hawaii	80
North Point of Hawaii.....	62	South Point of Hawaii.....	85

WIDTH OF CHANNELS.

Oahu and Molokai.....	23	Maui and Lanai.....	7
Diamond Head to S. W. Point of Molokai	30	Maui and Kahoolawe.....	6
Molokai and Lanai.....	7	Hawaii and Maui.....	26
Molokai and Maui.....	8	Kauai and Oahu.....	63
		Niihau and Kauai.....	15

OCEAN DISTANCES.

HONOLULU TO			
San Francisco	2100	Auckland	3810
San Diego	2260	Sydney	4410
Portland, Or.	2360	Hongkong	4920
Brito, Nicaragua	4200	Yokohama	3400
Panama	4720	Guam	3300
Tahiti	2440	Manila, via N. E. Cape.....	4890
Samoa	2290	Victoria, B. C.	2460
Fiji	2700	Midway Islands	1200

OVERLAND DISTANCES.

ISLAND OF OAHU.

HONOLULU POST-OFFICE TO

	Miles.		Miles.	Inter.
Bishop's corner (Waikiki).....	3.2	Punaluu	28.4	2.0
Waikiki Villa	3.6	Hauula	31.4	3.0
Diamond Head	5.9	Laie	34.4	3.0
Kaalawai	6.0	Kahuku Mill	37.2	2.8
		Kahuku Ranch	40.0	2.8
Thomas Square	1.0			
Pawaa corners	2.0	Moanalua	3.4	
Kamoiliili	3.3	Kalauao	7.4	4.0
Kaimuki Hill Reservoir 5.0	1.7	Ewa Church	10.2	2.8
Waialae	6.2	Kipapa	13.6	3.4
Niu	8.8	Kaukonahua	20.0	6.4
Koko Head	11.8	Leilehua	20.0	
Makapuu	14.8	Waialua	28.0	8.0
Waimanalo	20.8	Waimea	32.4	4.4
Waimanalo, via Pali	12.0	Kahuku Ranch	39.4	7.0
Nuuuanu Bridge	1.1			
Mausoleum	1.5	Ewa Church	10.2	
Electric Reservoir	2.7	Waipio (Brown's)	11.2	1.0
Luakaha	4.3	Hoaeae (Robinson's)	13.5	2.3
Nuuuanu Dam	5.0	Barber's Point, L. H.	21.5	8.0
Pali	6.6	Nanakuli	23.5	2.0
Kaneohe	11.9	Waianae Plantation	29.9	6.4
Waiahole	18.9	Kahanahaiki	36.9	7.0
Kualoa	21.9	Kaena Point	42.0	5.1
Kahana	26.4	Waialua to Kaena Pt.	12.0	

ISLAND OF HAWAII.

SOUTH KOHALA.—WAIMEA COURT HOUSE, TO

	Miles.	Inter.		Miles.	Inter.
Hamakua boundary ...	4.5	..	Hilo, via Humuula Stn.	54.0	25.0
Kukuihaele Mill	11.0	6.5	Keamuku Sheep Stn.	14.0	..
Mana	7.7	..	Napuu	22.0	8.0
Hanaipoe	15.0	7.3	Keawewai	8.0	..
Keanakolu	24.0	9.0	Waika	11.0	3.0
Puakala	34.0	10.0	Kahuwa	13.0	2.0
Laumaia	36.5	2.5	Puuhue	17.0	4.0
Auwaiakekua	12.5	..	Kohala Court House....	22.0	5.0
Humuula Sheep Sation 29.0	16.5		Mahukona	22.0	..
via Laumaia	47.5	..	Puako	12.0	..

NORTH KOHALA.—FOREIGN CHURCH, KOHALA, TO

	Miles.		Miles.
Edge of Pololu Gulch.....	4.00	Union Mill	2.25
Niulii Mill	2.80	Union Mill R. R. Station....	3.25
Halawa Mill	1.65	Honomakau	2.55
Hapuu Landing	2.15	Hind's, Hawi	3.25
Kohala Mill .....	.50	Hawi R. R. Station.....	4.25
Kohala Mill Landing	1.50	Honoipo	7.25
Native Church	1.00	Mahukona	10.50
		Puuhue Ranch	7.25

NORTH KOHALA.—ON MAIN ROAD, MAHUKONA TO

	Miles.	Inter.		Miles.	Inter.
Hind's Mill	7.0	..	Wight's Corner	11.5	1.1
Union Mill Corner.....	8.0	1.0	Niulii Corner	12.8	1.3
Court House	9.2	1.2	Pololu Edge of Gulch.....	14.5	1.7
Bond's Corner	9.7	0.5	Puu Hue	5.0	..
Kohala Mill Corner.....	10.4	0.7			

SOUTH KOHALA.—KAWAIHAE TO

	Miles.	Inter.		Miles.
Puu Ainako	4.4	..	Mana, Parker's	19.5
Puuki	7.7	3.3	Keawewai	6.0
Walaka, Catholic Ch... .	9.5	1.8	Puuhue Ranch	10.0
Puuopelu, Parker's	10.8	1.3	Kohala Court House	15.0
Waimea Court House	11.8	1.0	Mahukona	11.0
Waimea Church	12.2	0.4	Napuu	20.0
Kukuihaele Church	22.1	9.9	Puako	5.0

KONA.—KEALAKEKUA TO

Keauhou	6.0	..	Kawaihae	42.0	4.6
Holualoa	9.6	3.6	Honaunau	4.0	..
Kailua	12.0	2.4	Hookena	7.7	3.7
Kaloko	16.0	4.0	Olelomoana	15.2	7.5
Makalawena	19.6	3.6	Hoopoloa	21.6	6.4
Kiholo	27.6	8.0	Boundary of Kau.....	24.8	3.2
Ke Au a Lono bound'ry.	31.6	4.0	Flow of '87.....	32.0	7.2
Puako	37.4	5.8	Kahuku Ranch	36.5	4.5

KAU.—VOLCANO HOUSE TO

Half-way House	13.0	..	Honuapo	32.6	5.0
Kapapala	18.0	5.0	Naalehu	35.6	3.0
Pahala	23.0	5.0	Waiohinu	37.1	1.5
Punaluu	27.6	4.6	Kahuku Ranch	43.1	6.0

PUNA.—HILO COURT HOUSE TO

	Miles.			Miles.
Keaau, Forks of Road.....	9.0		Kaimu	32.0
Pahoia	20.0		Kalapana	33.0
Pohoiki	28.0		Keauhou	50.0
Kapoho (Lyman's)	32.0		Panau	40.0
Opihikao	31.0		Volcano House via Panau.....	56.0
Kamaili	26.0		Sand Hills, Naawale, old road.	18.5
Kamaili Beach	29.0		Kapoho, old road	22.0

TO VOLCANO.—HILO TO

Shipman's	1.7		Mountain View	16.8
Edge of Woods	4.1		Mason's	17.5
Coconut Grove	8.0		Hitchcock's	23.5
Branch Road to Puna.....	9.0		Cattle Pen	24.7
Furneaux's	13.2		Volcano House	31.0

THROUGH HILO DISTRICT TO

Honolii Bridge	2.5		Honohina Church	17.8
Papaikou Office	4.7		Waikaumalo Bridge	18.8
Onomea Church	6.9		Pohakupuka Bridge	21.0
Kaupakuea Cross Road	10.7		Maulua Gulch	22.0
Kolekole Bridge	14.3		Kaiwilahilahi Bridge	24.0
Hakalau, east edge gulch.....	15.0		Lydgate's House	26.1
Umauma Bridge	16.0		Laupahoehoe Church	26.7

THROUGH HAMAKUA.—LAUPAHOEHOE CHURCH TO

	Miles.	Miles.	
Bottom Kawalii Gulch.....	2.0	Kuaikalua Gulch	22.0
Ookala, Manager's House.....	4.0	Kapulena Church	23.9
Kealakaha Gulch	6.0	Waipanihua	24.3
Kukaiau Gulch	8.0	Stream at Kukuihaele	26.0
Horner's	8.5	Edge Waipio	26.5
Catholic Church, Kainehe	9.0	Bottom Waipio	27.0
Notley's, Paauilo	10.5	Waimanu (approximate)	32.5
Kaumoalii Bridge	12.5	Kukuihaele to Waimea (approximate)	10.5
Bottom Kalopa Gulch.....	14.0	Gov't. Road to Hamakua Mill..	1.5
Wm. Horner's, Paauhau.....	15.2	Gov't. Road to Paauhau Mill...	1.0
Paauhau Church	16.3	Gov't. Road to Pacific Sugar	
Holmes' Store, Honokaa.....	18.0	Mill, Kukuihaele	0.7
Honokaia Church	20.5		

ISLAND OF MAUI.

KAHULUI TO

	Miles.	Inter.	Miles.	Inter.
Spreckelsville	4.0	..	Paia P. O.....	7.2 ..
Paia P. O.....	7.2	3.2	Makawao Court House.	11.6 4.4
Hamakuapoko Mill	9.2	2.0	Olinda	18.5 6.9
Haiku P. O.....	11.0	1.8	Haleakala, edge Crater.	26.6 8.1
Halehaku	17.2	6.2	Haleakala Summit	28.6 2.0
Huelo School	20.2	3.0		
Keanae P. O.....	35.5	15.3	Maalaea	10.3 ..
Nahiku Landing	49.9	14.4	End of Mountain Road.	15.8 5.5
Ulaino School	49.2	.7	Olowalu	19.9 4.1
Hana P. O.....	55.6	6.4	Lahaina Court House..	25.5 5.6
Hamoa	58.2	2.6		
Wailua	62.6	4.4	Waiehu	6.4 ..
Kipahulu Mill	66.2	3.6	Waihee	7.3 0.9
Mokulau	71.8	5.6	Kahakuloa	16.3 9.0
Nuu	77.0	5.2	Honokohau	23.0 6.7
			Honolua	27.0 4.0
Wailuku	3.8	..	Napili	29.8 2.8
Waikapu	5.9	2.1	Honokawai	33.5 3.7
Maalaea	10.3	4.4	Lahaina Court House..	39.0 5.5
Kihei	12.6	2.3		
Kalepolepo	13.9	1.3	MAKENA TO	
Ulupalakua	23.6	9.7	Ulupalakua	3.5 ..
Kanaio	26.8	3.2	Kamaole	7.3 3.8
Pico's	33.8	7.0	Waiakoa	13.0 5.7
Nuu	40.6	6.8	Makawao P. O.....	20.8 7.8
			Makawao Court House.	23.0 2.2

ISLAND OF KAUAI.

NAWILIWILI TO

	Miles.	Inter.	Miles.	Inter.
Koloa	11.0	..	Wailua River	7.7 4.4
Lawai	13.8	2.8	Kealia	11.9 4.2
Hanapepe	20.0	6.2	Anahola	15.7 3.8
Waimea	27.1	7.1	Kilauea	23.6 7.9
Waiawa	31.5	4.4	Kalihiwai	26.6 3.0
Nuololo	44.8	13.3	Hanalei	31.8 5.2
Hanamaulu	3.3	..	Wainiha	34.8 3.0
			Nuololo (no road)	47.0 12.2

ISLAND OF MOLOKAI.

KAUNAKAKAI TO

	Miles.		Miles.
Meyer's, Kalae	5.0	Pukoo	15.0
Kalaupapa	9.0	Halawa	25.0
Kamalo	9.0	Ka Lae o ka Laau	19.0
Kaluaaha	13.5		

OAHU RAILWAY DISTANCES.—FROM HONOLULU DEPOT TO

	Miles.		Miles.
Puuloa	6.0	Gilbert	23.0
Aiea	9.0	Nanakuli	27.0
Kalauao	10.0	Waianae	33.0
Waiau	11.0	Makaha	35.0
Pearl City	12.0	Makua	41.0
Waipio	14.0	Kawaihapai	50.0
Waipahu	14.0	Mokuleia	53.0
Leilehua	27.0	Puuiki	55.0
Wahiawa	25.0	Waialua	56.0
Hoaeae	15.0	Haleiwa Hotel	56.0
Honouliuli	16.0	Waimea	62.0
Ewa Mill	18.0	Kahuku	71.0

Revised Areas and Coast Line Distances, Hawaiian Islands.

Prepared by R. D. King, Survey Department.

Courtesy Walter E. Wall, Surveyor, Terr. Hawaii.

Islands	Popltn. in 1910	Miles Square	Acres Area	Coast in Miles Line	Altitude in Feet
Hawaii	55,382	4,015.6	2,570,000	297	13,825
Oahu	81,993	598.0	382,720	177	4,030
Maui	28,623	728.1	466,000	146	10,032
Kauai	23,744	546.9	350,000	106	5,170
Molokai	1,791	260.9	167,000	100	4,958
Lanai	131	139.5	89,305	53	3,400
Niihau	208	72.8	46,575	48	1,300
Kahoolawe	2	44.2	28,260	30	1,427
Midway	35	.....	.....	...	43
	191,909	6,406.0	4,099,860	957	

Seating Capacity of Principal Churches, Halls and Places of Amusement—Honolulu.

Roman Catholic Cathedral, Fort street.....	1,500
Kawaiahao Church (Native), King street.....	1,000
Central Union Church, Beretania street.....	850
St. Andrew's Cathedral (Episcopal), Emma street.....	800
The Bijou (vaudeville).....	1,600
Ye Liberty Theater.....	1,600
Empire Theater (moving pictures).....	930
Y. M. C. A. game hall.....	850
Mission Memorial Auditorium	600

**Total Population by Districts and Islands — Comparative,
1900 and 1910.**

HAWAII	1900	1910	OAHU	1900	1910
Hilo	19,785	22,545	Honolulu	39,306	52,183
Puna	5,128	6,834	Ewa	9,689	14,627
Kau	3,854	4,078	Waianae	1,008	1,958
North Kona.....	3,819	3,377	Waialua	3,285	6,770
South Kona.....	2,372	3,191	Koolauloa	2,372	3,204
North Kohala....	4,366	5,398	Koolaupoko	2,844	3,251
South Kohala....	600	922			
Hamakua	6,919	9,037		58,504	81,993
	47,843	55,382	Midway		35
MAUI			KAUAI		
Lahaina	4,352	4,787	Waimea	5,714	7,987
Wailuku	7,953	11,742	Niihau	172	208
Hana	5,276	3,241	Koloa	4,564	5,769
Makawao	7,236	8,855	Kawaihau	3,220	2,580
	24,797	28,625	Hanalei	2,630	2,457
Molokai	3,123	1,791	Lihue	4,434	4,951
Lanai .....	.....	131	Total whole group	20,734	23,952
				154,001	191,009

Population in 1910 by Age, Groups, Sex and Race.

COLOR OR RACE	Under 21 yrs.		21 yrs. & over.		All ages.		
	Male	Female	Male	Female	Male	Female	Total
Hawaiian	5,513	5,404	7,926	7,198	13,439	12,602	26,041
Caucasian-Hawn.	2,956	2,813	1,482	1,521	4,438	4,334	8,772
Asiatic-Hawn. ...	1,363	1,391	449	531	1,812	1,922	3,734
Portuguese	6,599	6,508	4,974	4,222	11,573	10,730	22,303
Porto Rican.....	1,315	1,216	1,563	796	2,878	2,012	4,890
Spanish	610	569	468	343	1,078	912	1,990
Other Caucasian..	2,359	2,244	6,896	3,368	9,255	5,612	14,867
Chinese	3,453	2,930	13,695	1,596	17,148	4,526	21,674
Japanese	12,989	11,016	41,794	13,875	54,783	24,891	79,674
Korean	400	306	3,531	296	3,931	602	4,533
Black and Mulatto	191	196	224	84	415	280	695
All Other	1,355	245	994	142	2,349	387	2,736
Total.....	39,103	34,838	83,996	33,972	123,099	68,810	191,009

Population of Honolulu, various census periods.

1890.....	22,907	1896.....	29,926
1900.....	39,300	1910.....	52,183

Population of Honolulu and Hilo by Race and Sex, 1910.

From Tables of the Bureau of Census.

Race	Honolulu		Hilo	
	Male	Female	Male	Female
Hawaiian	3,969	3,941	369	295
Caucasian-Hawaiian	2,000	2,233	218	200
Asiatic-Hawaiian	653	727	98	122
Portuguese	3,042	3,105	552	586
Porto Rican.....	210	177	63	46
Spanish	141	117	37	30
Other Caucasian.....	5,627	3,573	382	295
Chinese	6,948	2,626	335	100
Japanese	7,659	4,434	1,699	1,080
Korean	352	108	26	1
Filipino	68	19	66	10
Negro	179	148	6	....
All other	66	61	15	14
Total.....	30,914	21,269	3,866	2,879

**Comparative Table of Population, Hawaiian Islands—
Census Periods 1860-1910.**

Islands	1860	1866	1872	1878	1884	1890	1896	1900	1910
Hawaii	21,481	19,808	16,001	17,034	24,994	26,754	33,285	46,943	55,382
Maui	16,400	14,035	12,334	12,109	15,970	17,357	17,726	24,797	28,623
Oahu	21,275	19,799	20,671	29,236	28,068	31,194	40,205	58,504	81,993
Kauai	6,487	6,299	4,961	5,634	*8,935	11,643	15,228	20,562	23,744
Molokai	2,864	2,299	2,349	2,581	} 2614	2,652	2,307	2,504	1,791
Lanai	646	394	348	214		174	105	619	131
Niihau	647	325	233	177	.....	216	164	172	208
Kahoolawe .....	.....	.....	.....	.....	.....	.....	.....	.....	2
Midway .....	.....	.....	.....	.....	.....	.....	.....	.....	35
Total	69,800	62,959	56,897	57,985	80,578	89,900	109,020	154,001	191,909
All Foreigners	2,716	4,194	5,366	10,477	36,346	49,368	69,516	116,366	153,362
Hawaiians	67,084	58,765	51,531	47,508	44,228	40,622	39,504	37,635	35,547

The nationality of teachers in all schools of the Islands, 1916, was as follows: Hawaiian, 99; Part-Hawaiian, 233; American, 561; English, 49; Germans, 23; Portuguese, 97; Chinese, 55; Japanese, 23; Spanish, 3; other Foreigners, 28. Total, 1,171.

Population by Race and Sex, 1910, and per cent of change since 1900.

RACES	Total Populat'n	Native Born	Foreign Born	Males	Females	% Change
Hawaiian	26,041	26,041	.....	13,439	12,602	12.58 dec
Caucas'n-Hawn.	8,772	8,772	.....	4,448	4,334	
Asiatic-Hawn.	3,734	3,734	.....	1,812	1,922	} 59.35 inc
Portuguese	22,303	13,766	8,537	11,573	10,730	42.28 "
Spanish	1,990	357	1,633	1,078	912	new
Porto Rican.....	4,890	4,830	.....	2,878	2,012	"
Other Caucas'n....	14,867	9,917	4,950	9,255	5,612	40.56 inc
Chinese	21,674	7,195	14,479	17,148	4,526	15.87 dec
Japanese	79,674	19,889	59,785	54,783	24,891	30.37 inc
Korean	4,533	362	4,171	3,931	602	
Black and Mulatto..	695	602	93	415	280	
All others	2,736	2,632	104	2,349	387	} 146.03 "
Total.....	191,909	98,157	93,752	123,099	68,810	24.62 Net Inc.

Illiterates in the Population Territory of Hawaii, 10 Years of Age and Over, Census of 1910.

Race	Per cent.	Race	Per cent.
All races	26.8	Spanish	49.6
Hawaiian	4.7	Other Caucasian	3.5
Caucasian-Hawaiian	1.3	Chinese	32.3
Asiatic-Hawaiian	1.8	Japanese	35.0
Portuguese	35.4	Korean	25.9
Porto Rican	73.2	Filipino and all other.....	32.4

The Census Bureau classes as illiterate any person ten years of age, or over, who is unable to write, regardless of ability to read.

Estimated Population, 1916, Territory of Hawaii, by Nationality.

From Board of Health Report.

Race	Number	Race	Number
American		Japanese	102,479
British		Portuguese	23,990
German }	30,118	Porto Rican	5,240
Russian }		Spanish	2,920
Chinese	22,100	Korean	4,734
Filipino	19,100	Others	646
Hawaiian	23,450	Total.....	250,627
Part-Hawaiian	15,850		

Births and Deaths by Nationalities and Counties, 1917.

Nationality	Oahu				Hawaii		Maui		Kalawao		Kauai		TOTAL	
	Honolulu	Other Dist.	B	D	B	D	B	D	B	D	B	D	B	D
American..	238	98	11	33	11	6	18	3	....	....	7	1	285	141
British....	23	25	3	2	11	4	5	4	....	....	1	2	43	37
Chinese....	446	140	55	16	64	45	45	37	....	5	38	28	648	271
German....	14	11	2	1	3	....	1	3	....	1	4	4	24	20
Hawaiian..	154	347	57	70	164	167	153	158	8	45	45	49	581	844
Part Haw'n.	451	144	55	13	163	30	142	32	7	8	40	12	858	239
Japanese...	1007	315	822	196	1,140	364	659	217	1	2	483	159	4,112	1,246
Portuguese.	220	98	87	18	323	68	189	62	1	3	109	27	929	277
Porto Rican	9	3	28	4	100	28	26	6	....	....	28	17	191	57
Spanish....	7	8	34	5	59	18	50	17	....	....	43	10	193	58
Russian....	3	8	....	1	5	....	5	1	....	1	....	1	13	12
Filipino....	33	40	79	42	111	71	44	32	....	....	71	45	338	229
Korean....	39	18	14	3	33	11	15	5	....	1	24	9	125	47
Others.....	11	14	2	1	5	1	1	3	....	....	5	1	24	20
	2,655	1,269	1,249	405	2,192	813	1,353	580	17	66	898	365	8,364	3,498
Unrecorded	109		90		98		27				19		343	
Total....	2,764	1,269	1,339	405	2,290	813	1,380	580	17	66	917	365	8,707	3,498

Vital Statistics, Territory of Hawaii, 1917.

For Fiscal Year ending June, compiled from Board of Health Report.
Table of Births, Marriages and Deaths by Counties.

Islands, Etc.	Est. Popltn.	Births	Marriages	Deaths
Honolulu	71,950	2,764	1,844	1,269
Other Oahu Districts	41,000	1,339	83	405
Hawaii County	68,500	2,290	402	813
Maui County	38,000	1,380	264	580
Kalawao County	690	17	9	66
Kauai County	30,487	917	160	365
Total, 1916-17	250,627	8,707	2,762	3,498
Total, 1915-16	237,623	7,899	2,716	3,940
" 1914-15	231,210	7,278	2,730	3,556

Nationality of Plantation Labor, June 30, 1916, and
June 30, 1917.

Courtesy Bureau of Labor and Statistics, Hawaiian Sugar Planters' Ass'n.

	1916	1917		1916	1917
Americans	701	730	Japanese	25,244	25,449
Spanish	1,347	946	Chinese	2,070	2,039
Portuguese	3,487	3,392	Koreans	1,430	1,370
Russians	59	49	Filipinos	8,991	9,971
Hawaiians	1,012	992	Others	303	306
Porto Ricans	1,476	1,451	Total.....	46,117	46,695

School Statistics, Territory of Hawaii, 1917.

From Report of the Superintendent of Public Instruction.
NUMBER OF SCHOOLS, CLASS, ETC.

Islands	Public Schools June 30, 1917.					Private Schools Dec. 31, 1916.		
	No. of Schools	No. of Teachers	No. of Pupils			No. of Schools	No. of Teachers	No. of Pupils
			Boys	Girls	Total			
Hawaii.....	63	241	4,984	4,429	9,413	8	33	950
Maui, Molokai....	45	140	2,568	2,251	4,819	7	33	1,105
Kauai.....	20	116	2,338	1,980	4,318	2	4	75
Oahu.....	40	358	7,293	6,439	13,732	34	246	4,616
Totals.....	168	855	17,183	15,099	32,282	51	316	6,746

NUMBER OF SCHOOLS, TEACHERS AND PUPILS.

Class	Schools	Teachers			Pupils		
		M.	F.	Total	M.	F.	Total
Public Schools.....	168	139	716	855	17,183	15,099	32,282
Private "	51	91	225	316	3,658	3,088	6,746
Totals.....	219	230	941	1,171	20,841	18,187	39,028

AGES OF PUPILS IN PUBLIC AND PRIVATE SCHOOLS.

Schools	Under 6	6-9	10-15	Over 15	Total
Public Schools.....	83	14,242	16,574	1,383	32,282
Private "	1,264	1,435	2,717	1,331	6,746
Total.....	1,347	15,677	19,290	2,714	39,028

NATIONALITY OF PUPILS.

Races	Public	Private	Races	Public	Private
Hawaiian	3,131	619	Spanish	663	64
Part Hawaiian ..	3,526	1,412	Chinese	3,062	1,014
American	878	915	Japanese	13,804	1,058
British	97	55	Porto Rican	1,043	68
German	187	90	Korean	361	154
Portuguese	4,744	1,143	Russian	110	32
Filipinos	534	51	Other Foreigners	142	71
			Total.....	32,282	6,746

Value Domestic Mdse. Shipments to the United States from Hawaii for Fiscal Years Ending June 30, 1916 and 1917.

Compiled from Monthly Summary of Commerce and Finance,
Bureau of Statistics.

Articles.	1916	1917
Animals	\$ 2,247	\$ 786
Art works, paintings, etc.....	1,000	1,315
Bones, hoofs, etc.....	1,939	4,871
Beeswax	17,047	7,497
Breadstuffs	15,833	12,813
Chemicals, drugs, etc.	3,721	3,173
Coffee	343,829	297,972
Cotton and manufactures of		1,843
Fibers, unmanufactured—Sisal	68,764	89,543
Fruits and nuts	6,850,655	8,194,284
Hides and skins	259,623	295,216
Honey	53,163	62,462
Household and personal effects.....	6,895	24,527
Meat products, tallow	7,012	18,578
Molasses	327,284	392,110
Musical instruments	36,835	85,167
Paper and manufactures of	2,863	1,518
Pineapple juice	8,750	36,529
Rice	141,964	165,779
Straw and palm leaf, manufactures of	722	550
Sugar, brown	52,516,283	60,137,962
Sugar, refined	1,901,812	2,603,202
Tobacco leaf, unmanufactured	4,420	1,205
Vegetables	14,629	16,080
Wool, raw	31,152	27,395
Wood and manufactures of	56,829	93,992
All other articles	28,459	38,265
Total value shipments Hawaiian products.	\$62,703,730	72,614,625
Returned shipments merchandise	1,685,867	1,751,313
Total to United States	48,700	112,122
Shipments foreign merchandise	\$64,438,297	\$74,478,060

Shipments of Gold and Silver, 1917.

From United States to Hawaii:

Gold, \$2,760,880

Silver, 282,920

From Hawaii to United States: Gold..... 309,815

Import Values from United States, Comparative, for Fiscal Years Ending June, 1916 and 1917.

Compiled from Monthly Summary of Commerce and Finance,
Bureau of Statistics.

Articles.	Domestic Merchandise	
	1916	1917
Agricultural Implements	\$ 54,227	\$ 58,583
Animals	201,787	233,363
Automobiles and parts of	2,102,924	2,111,997
Books, Maps, Engravings, etc.....	298,422	524,435
Boots and Shoes	494,526	875,010
Brass, and manufactures of	96,606	178,108
Breadstuffs	2,322,166	3,142,022
Brooms and Brushes	38,400	60,794
Carriages, Cars, etc., and parts of	228,667	278,075
Cement	332,328	538,235
Chemicals, Drugs, Dyes, etc.....	552,717	649,878
Clocks, Watches, and parts of	27,146	45,325
Coal	26,378	125,457
Cocoa and Chocolate	38,848	66,361
Coffee, prepared	4,467	6,964
Copper, and manufactures of	133,962	201,006
Cotton, manufactures of, and clothing	2,367,006	3,416,098
Earthen, Stone and Chinaware	101,421	135,994
Eggs	91,698	120,000
Electrical Machinery and Instruments	527,876	1,004,966
Explosives	519,501	422,973
Fertilizers	1,256,868	2,127,381
Fibers, Textile Grasses, manufactures of	257,285	337,453
Fish	403,159	473,566
Fruits and Nuts	451,568	548,693
Furniture of Metal	71,618	114,134
Glass and Glassware	185,928	298,518
Hay	279,662	376,049
Household and Personal Effects	230,380	132,926
India Rubber, manufactures of	791,491	1,105,487
Instruments, etc., for scientific purposes	17,742	21,095
Iron and Steel, and manufactures of	223,937	347,968
Sheets and Plates, etc.....	209,342	288,245
Builders' Hardware, etc.....	448,373	731,660
Machinery, Machines, parts of	928,107	1,587,687
Nails, Spikes, Pipes, etc.....	3,199,382	4,741,405
Jewelry and manufactures, Gold and Silver...	211,363	218,083
Lamps, Chandeliers, etc.....	36,110	43,007
Lead and manufactures of	61,980	86,779
Leather and manufactures of	281,199	457,279
Marble, Stone, and manufactures of	18,411	61,674
Musical Instruments	89,486	153,270

Import Values from United States for 1916-17—Continued.

Articles.	Domestic Merchandise	
	1916	1917
Naval Stores	\$ 14,213	\$ 11,505
Oil Cloth	20,137	30,171
Oils: Mineral, Crude	1,078,258	1,586,373
Refined, etc.....	911,649	1,654,499
Vegetable	75,452	141,753
Paints, Pigments and Colors	367,607	488,198
Paper and manufactures of	472,198	791,671
Perfumery, etc.....	49,738	74,735
Phonographs, etc.....	61,628	59,883
Photographic Goods	138,076	204,941
Provisions, etc., Beef Products	166,918	202,025
Hog and other Meat Products.....	782,840	963,792
Dairy Products	629,825	878,816
Rice	7,307	267,423
Roofing Felt, etc.....	29,643	42,096
Salt	21,724	28,249
Silk and manufactures of	211,177	263,914
Soap: Toilet and other	286,069	321,454
Spirits, etc.: Malt Liquors	268,995	249,676
Spirits, distilled	144,105	209,037
Wines	259,168	291,653
Starch	10,882	22,367
Straw and Palm Leaf, manufactures of	94,722	125,487
Sugar, Molasses and Syrup	139,770	112,192
Confectionery	129,455	231,511
Tin and manufactures of	66,214	126,336
Tobacco, manufactures of	808,153	978,773
Toys	60,808	76,523
Vegetables	471,404	710,543
Wood and Mfrs.:		
Lumber, Shingles, etc.	754,744	1,222,969
Shooks, box	248,232	415,918
Doors, Sash, Blinds	102,879	148,914
Furniture	240,659	359,093
Trimmings, Molding and other manfrs.	364,127	500,640
Wool and manufactures of	317,584	445,679
All other articles	757,334	990,446
 Total domestic merchandise	\$30,825.187	\$43,967,256
Total value foreign merchandise from U.S.	302,390	307,219

**Quantity and Value of Principal Articles of Domestic Produce
Shipped to U. S. for the Fiscal Year Ending June 30, 1917.**

Compiled from Monthly Summary of Commerce and Finance,
Bureau of Statistics.

Articles		Quantity	Value
Sugar, raw	pounds...	1,127,825,256	\$60,137,962
Sugar, refined	" ...	34,779,800	2,603,202
Coffee, raw	" ...	1,987,035	297,972
Rice	" ...	3,527,846	165,779
Fibers, sisal	tons.....	348	89,543
Fruits: Fresh Bananas	bunches..	257,037	178,675
Fresh Pineapples .....	.....	.....	23,546
Canned Pineapples .....	.....	.....	7,970,522
All other .....	.....	.....	5,393
Pineapple Juice .....	.....	.....	36,520
Beeswax	pounds...	21,902	7,497
Honey .....	.....	.....	62,462
Molasses	gallons...	10,979,383	392,110
Hides and Skins	pounds...	1,481,717	295,216
Wool, raw	" ...	381,441	93,992
Timber, lumber & unmfrd wood	M ft.....	43	3,037

Hawaiian Imports and Exports, Fiscal Year 1917.

Courtesy of Collector of Customs.

Countries:	Imports to June 30.	Exports to March 31.
Australia	\$ 164,571	\$ 8,684
Br. Oceania	70,166	76,194
Br. India	1,130,449	453
Canada	28,405	159,707
Chile	899,358	40
England	60,583	7,744
France	7,902	.....
Germany	2,507	.....
Hongkong	428,126	5,348
Japan	3,405,571	203,752
Scotland	26,079	.....
Other	258,234	173,942
United States*	39,876,390	74,480,119
Totals.....	\$46,358,341	\$75,115,983

* The tables from the Summary of Commerce and Finance, on pages 21-23, differ in the amounts here shown.

Number and Tonnage of Vessels Entering and Clearing at all Ports, District of Hawaii, 1917.

[Not including Transports and bunker coal vessels.]

Ports	Entered		Cleared	
	Vessels	Tons	Vessels	Tons
Honolulu	—Coastwise	260	726,607	277
	Foreign	149	538,783	125
Hilo	—Coastwise	48	77,557	36
	Foreign	0	.....	1
Kahului	—Coastwise	15	17,948	17
	Foreign	1	1,778	0
Koloa	—Coastwise	7	4,708	14
	Foreign	6	4,953	0
Mahukona	—Coastwise	3	2,177	9
	Foreign	0	.....	0
Total	489	1,374,511	479	1,390,821

Summary of Insurance Business, Territory of Hawaii, for 1916
From Report of Insurance Commissioner.

Class	Amount Written	Amount Premiums	Losses and Claims paid
Fire	\$ 39,784,264.66	\$ 692,232.98	\$ 53,217.44
Marine	99,875,114.35	302,488.43	18,235.73
Life	4,088,336.00	*.931,711.07	166,129.69
Accident and Health .....	.....	45,701.67	5,329.98
Automobile .....	.....	40,301.09	4,928.18
Burglary .....	.....	676.85	.....
Employers' Liability .....	.....	7,460.13	2,565.00
Surety and Fidelity .....	.....	44,073.30	3,779.48
Plate Glass .....	.....	2,684.15	316.84
Workmen's Compensation.	.....	101,485.89	18,752.87
Other .....	.....	4,012.49	979.50
Total	\$143,747,715.01	\$ 2,172,828.05	\$ 274,232.71

* Of this amount \$749,652.47 is renewals.

Hawaiian Sugar Export Statistics from 1901.

For earlier years see Annuals 1896-1914.

Year	Sugar		Molasses		Ttl. export Value
	Pounds	Value	Gallons	Value	
1901	690,882,132	\$27,094,155	93,820	\$ 4,615	\$27,098,770
1902	720,553,357	23,920,113	48,036	2,187	23,922,300
1903	774,825,420	25,310,684	10	1	25,310,685
1904	736,491,992	24,359,385	11,187	712	24,360,097
1905	832,721,637	35,112,148	26,777	1,282	35,113,430
1906	746,602,637	24,495,427	3,180	177	24,495,604
1907	822,014,811	27,692,997	6,917	355	27,693,352
1908	1,077,570,637	39,816,062	23	20	39,816,082
1909	1,022,863,927	37,632,742	728	79	37,632,821
1910	1,111,594,466	42,825,062	100	7	42,825,069
1911	1,011,215,858	36,704,656	1,801,796	89,708	36,794,364
1912	1,205,465,510	49,961,509	1,734,318	77,241	50,038,750
1913	1,085,362,344	36,607,820	3,736,877	140,610	36,748,430
1914	1,114,750,702	33,187,920	4,110,404	149,597	33,337,517
1915	1,280,917,435	52,953,009	5,202,913	195,485	53,148,594
1916	1,137,164,228	54,418,300	8,399,014	327,284	54,745,584
1917	1,162,805,056	62,741,164	10,979,383	392,110	63,133,274

Passengers to and from Hawaii, Fiscal Year 1917.

Courtesy Department of Secretary.

Nationality	Arrivals			Departures		
	Cabin	Steer-age	Total	Cabin	Steer-age	Total
Chinese	101	471	572	47	419	466
Japanese	290	4,029	4,319	171	3,448	3,616
Filipinos	2	2,932	2,934	26	1,138	1,156
Koreans	6	38	44	2	23	25
Portuguese . . . . .	.....	159	159	.....	367	367
Spaniards . . . . .	.....	15	15	.....	1,003	1,003
Russians . . . . .	.....	17	17	.....	61	61
Hindus	1	.....	1	1	2	3
Porto Ricans . . . . .	.....	.....	.....	.....	41	41
All Others-Europeans	9,888	682	10,570	9,699	708	10,407
Total.	10,288	8,343	18,631	9,946	7,202	17,148

Hawaii's Annual Trade Balance, etc., from 1901.

Year	Imports	Exports	Excess export Values	Custom house Receipts
1901	\$24,964,693	\$29,342,697	\$ 4,378,003	\$ 1,264,862
1902	22,036,583	24,793,735	2,757,152	1,327,518
1903	13,982,485	26,275,438	12,292,953	1,193,677
1904	15,784,691	25,204,875	9,420,184	1,229,338
1905	14,718,483	36,174,526	21,456,043	1,043,340
1906	15,639,874	26,994,824	11,354,950	1,218,764
1907	18,662,434	29,303,695	10,641,261	1,458,843
1908	19,757,270	42,241,921	22,484,651	1,550,157
1909	22,241,041	42,281,777	20,040,736	1,396,379
1910	26,152,435	47,029,631	20,877,196	1,450,324
1911	28,065,626	42,666,197	14,600,571	1,654,761
1912	28,694,322	55,449,438	26,755,116	1,643,197
1913	37,519,620	43,471,830	5,952,210	1,869,513
1914	31,550,257	41,594,072	6,043,815	1,184,416
1915	26,416,031	62,464,759	36,048,728	1,019,534
1916	34,098,210	64,670,852	30,572,642	1,161,051
1917	46,358,341	75,115,983	28,757,642	1,169,085

Receipts, Expenditures, and Public Debt of Hawaii, from 1901.

(From Official Reports.)

Years	Revenue	Expenditures	Cash Balance in Treasury	Public Debt
1901	2,140,297.36	2,576,685.53	75,994.97	939,970.31
1902	2,473,172.81	2,382,968.90	287,131.30	1,093,970.31
1903	2,387,715.88	2,603,194.20	73,181.63	2,185,000.00
1904	2,415,356.33	2,844,054.81	56,613.29	3,317,000.00
1905	2,354,783.37	2,240,731.55	59,408.49	3,861,000.00
1906	3,320,998.90	2,512,675.89	335,331.37	3,818,000.00
1907	2,716,624.00	2,665,845.74	348,216.51	3,718,000.00
1908	2,551,522.21	2,508,001.51	391,737.19	3,979,000.00
1909	3,051,526.81	3,160,875.81	453,106.76	3,959,000.00
1910	3,641,245.35	3,435,082.87	845,218.51	4,079,000.00
1911	3,482,560.84	3,730,765.16	822,282.07	4,004,000.00
1912	3,963,588.55	4,002,483.00	690,550.70	5,454,000.00
1913	4,300,780.71	4,261,468.66	716,729.60	6,844,000.00
1914	3,925,187.95	4,263,863.64	366,001.24	6,844,000.00
1915	4,539,241.04	4,446,415.65	464,040.43	7,873,500.00
1916	5,626,905.33	5,553,700.66	539,388.71	8,024,000.00
1917	5,944,352.95	5,638,429.13	889,508.42	7,874,000.00

Hawaii's Bonded Debt, June 30, 1917.

Refund Bonds, 1905, 4%	.....	\$ 450,000
Public Improvement 3½% Bonds	.....	1,244,000
Public Improvement 4% Bonds	.....	6,180,000
Total Bonds Outstanding	.....	\$7,874,000

**Assessed Values Real and Personal Property for 1917,
by races of tax-payers.**

Tables Courtesy of Treasury Department.

Taxpayers	Real Estate		Personal Property	
	No. Tax payers	Assessed Value	No. Tax payers	Assessed Value
Corporations, etc.	701	\$ 80,006,477	771	\$ 90,332,484
Anglo-Saxons	3,243	25,105,893	2,050	3,622,442
Hawaiians	6,189	15,373,985	2,213	1,747,938
Chinese	1,051	2,616,541	2,005	2,389,641
Japanese	1,025	1,364,140	3,851	3,792,076
Portuguese & Spanish	2,471	4,872,965	1,577	696,337
Total.....	14,680	\$129,340,001	12,467	\$102,580,918

Hawaiian Corporations, 1917.

Class.	Total No.	Number and Capital Incorporated before and after Aug. 12, 1898				Total
		No.	Before	No.	After	
Agriculture ..	154	47	\$47,865,750	107	\$35,732,950	\$ 85,598,700
Mercantile ..	401	40	19,607,625	361	43,223,943	62,831,568
Railroad	9	5	7,370,000	4	7,129,960	14,499,960
Street Car ...	2	...	.....	2	1,950,000	1,950,000
Steamship ...	1	1	3,000,000	...	.....	3,000,000
Bank	7	1	600,000	6	1,650,000	2,250,000
Savgs. & Loan	13	...	.....	13	746,000	746,000
Trust	7	1	200,000	6	800,000	1,000,000
Insurance ...	2	...	.....	2	200,000	200,000
Eleemosynary	157	34	.....	123	.....	.....
Total....	753	129	\$78,643,375	624	\$91,432,853	\$170,076,228

Growth of Bank Deposits, Territory of Hawaii.

Fiscal Year—	No. Banks	Commercial Deposits	Savings Deposits	Total
1907	11	\$ 4,966,042.04	\$ 2,777,554.40	\$ 7,743,596.44
1908	11	5,074,836.16	2,588,722.87	7,663,559.03
1909	11	6,334,991.42	3,322,827.79	9,657,819.21
1910	11	9,033,385.97	4,290,919.57	13,324,305.54
1911	16	10,289,707.89	5,020,555.62	15,310,263.51
1912	17	12,667,162.39	5,521,973.11	18,189,135.50
1913	17	11,641,901.30	5,384,395.72	17,026,297.02
1914	18	10,371,874.60	6,275,790.63	16,647,665.23
1915	19	12,378,041.53	7,736,569.32	20,114,610.85
1916	19	17,317,339.40	9,061,910.28	26,379,249.68
1917	22	22,486,524.31	10,205,496.70	32,692,021.01

Taxes by Division and Counties for the Fiscal Year Ended June 30, 1917.

Courtesy of Auditing Department.

DIVISION OF TAXES	OAHU.	MAUI.	HAWAII.	KAUAI.	TOTALS.
Special Territorial	\$ 37,995.75	\$	\$	\$	\$ 37,995.75
Real Estate	739,908.90	305,167.43	358,837.32	143,958.85	1,547,872.50
Personal Property	528,609.85	215,027.59	281,294.18	161,624.65	1,186,556.27
Penalties	1,573.85	123.30	565.80	17.25	2,280.20
Court Costs and Interest	4,287.06	761.58	6,223.64	1,152.95	12,425.23
Bicycles	3,135.80	778.20	748.20	462.00	5,124.20
Automobiles	68,421.30	14,563.35	19,523.35	11,049.60	113,557.60
Carriages, Carts, Etc.	12,075.00	3,715.00	5,805.00	4,120.00	25,715.00
Brakes and Sulkies	476.00	136.00	532.00	338.00	1,482.00
Road	42,118.29	19,447.04	34,091.63	15,221.95	110,878.91
Poll	20,712.21	9,619.73	16,962.99	7,574.65	54,869.58
Dog and Dog Tags	2,294.34	1,060.00	2,301.35	1,038.50	6,694.19
School	41,388.59	19,241.89	33,904.18	15,149.50	109,684.16
Income	665,596.73	80,547.63	32,811.70	20,844.80	799,800.86
Special Income	309,533.87	37,752.34	12,077.59	8,556.55	367,920.35
Total.....	\$2,478,127.54	\$707,941.08	\$805,678.93	\$391,109.25	\$4,382,856.80

TABLE OF RAINFALL, Principal Stations.

Compiled from Weather Bureau Reports.

Stations	Observer	1916					
		July	Aug.	Sept.	Oct.	Nov.	Dec.
HAWAII							
Waiakea.....	D. Forbes	10.17	12.86	10.39	10.58	16.55	15.37
Hilo (Town).....	L. C. Lyman ..	8.78	12.54	13.38	11.37	15.42	23.06
Ponahawai.....	I. E. Gamalielson	13.20	17.12	10.68	15.76	21.19	45.33
Pepeekeo.....	Pepeekeo S. Co.	7.57	12.70	12.62	12.08	12.94	28.07
Hakalau.....	W. F. Klatt	9.29	18.75	11.89	13.22	12.23	34.05
Laupahoehoe.....	E. W. Barnard..	10.71	13.45	7.34	4.97	11.54	27.40
Ookala.....	Kaiwiki S. Co..	10.51	9.44	4.16	2.95	9.33	26.19
Kukaiau.....	F. F. Bechert ..	5.92	4.17	2.98	2.06	5.98	19.50
Paauhau.....	G. B. Wait.....	2.18	3.19	1.85	1.35	3.51	11.56
Honokaa.....	Pac. Sug. Mill..	2.58	4.15	3.36	2.08	3.89	14.37
Waimea.....	F. Pinho	2.24	2.15	1.45	2.17	2.65	8.16
Kohala.....	Dr. B. D. Bond.	5.16	7.39	4.67	2.05	1.75	9.08
Holualoa.....	Kona Dev. Co...	....	....	5.70	5.20	1.89	4.30
Kealakekua.....	Robt. Wallace..	6.61	6.21	3.55	7.66	2.21	3.74
Naalehu.....	Hute'n S. P. Co.	0.68	1.59	1.45	4.27	1.70	15.79
Pahala.....	Haw. Agr. Co..	0.02	0.82	1.55	5.85	1.51	18.60
Volcano Obs.....	T. A. Jaggar Jr.	6.76	5.66	5.92	9.33	8.11	25.32
Olaa (17 miles)...	Olaa Sugar Co..	15.47	15.39	13.10	15.89	20.11	46.71
Kapoho.....	H. J. Lyman ...	5.08	7.79	7.95	6.98	9.85	19.21
MAUI							
Haleakala Ranch.	L. von Tempsky	1.11	1.52	1.01	0.30	1.62	23.25
Puuomalei.....	A. McKibbin ...	4.02	4.33	5.29	2.52	5.21	18.94
Makawao.....	F. W. Hardy ...	1.98	1.54	2.11	0.65	5.55	17.70
Kula.....	A. von Tempsky	2.32	1.17	2.14	2.70	0.25	1.28
Haiku.....	Mrs. L.B. Atwater	4.94	4.11	4.51	2.96	7.11	11.52
Keanae Valley....	G. W. Weight..	17.87	24.87	20.13	16.89	26.24	45.79
Nahiku.....	Jno. S. Goodell.	12.78	16.40	15.82	13.22	17.71	23.24
Wailuku.....	Bro. Frank	0.84	0.09	0.13	0.23	0.97	6.98
Hana.....	Kaeleku S. Co...	5.15	....	....	6.01	5.89	10.97
OAHU							
Honolulu.....	U. S. Weath. Bu.	1.72	1.09	0.60	1.21	1.31	5.54
Kinau Street....	W. R. Castle ...	1.38	1.09	0.71	1.06	1.29	6.26
Manoa.....	C. S. Desky	7.02	10.19	6.76	6.14	9.52	15.82
Electric Lt. St....	A. Walker	7.45	9.36	6.62	10.09	12.55	19.28
Luakaha.....	L. A. Moore ...	10.13	13.43	9.59	12.72	16.15	26.04
Waimanalo.....	Ed. Todd	1.57	1.49	0.87	1.32	1.69	5.44
Maunawili.....	Jno. Herd	4.70	5.02	3.91	3.57	5.23	10.08
Waialua Mill....	A. T. Correa ...	0.80	1.05	0.75	1.65	1.99	8.21
Kahuku.....	H. T. Christfrsn.	2.46	1.96	1.82	2.67	4.10	6.08
Ewa Plantation..	I. A. Hattie	0.48	1.60	0.55	1.57	0.55	3.49
Schofield Brks...	Surgeon U.S.A..	1.75	1.69	3.90	5.30	1.97	6.41
Waiaawa.....	A.. Lister	3.04	2.98	1.80	3.21	6.11	15.11
Waimalu.....	Hon. Plan. Co..	1.29	1.13	1.72	1.89	2.90	7.37
KAUAI							
Grove Farm.....	G. N. Wilcox ...	3.35	2.00	2.57	3.86	7.64	12.96
Kealia.....	Makee Sgr. Co..	3.15	1.76	1.85	1.60	4.16	9.15
Kilauea.....	Kilauea Sug. Co.	4.38	3.45	2.64	3.30	7.43	9.61
Eleele.....	McBryde S. Co.	1.77	1.04	2.06	2.11	4.29	6.88
Kukuiula.....	F. L. Zoller	1.80	1.60	0.30	3.20	6.10	7.90
Waiaawa.....	G. Anderson ...	.00	.00	.29	2.85	1.24	3.07

Throughout the Hawaiian Islands, 1916-1917.

By A. M. Hamrick, Section Director. Continued from last Annual.

Locality	Ft. Elv.	1917						
		Jan.	Feb.	Mar.	Apr.	May	June	Year
HAWAII								
Waiakea	50	16.57	3.15	22.27	13.98	6.85	9.07	167.81
Hilo	100	8.45	3.94	19.15	12.20	8.06	4.58	140.93
Ponahawai	500	15.87	3.22	24.70	16.56	7.97	8.64	200.24
Pepeekeo	100	14.04	4.01	20.46	12.67	8.49	7.83	153.48
Hakalau	200	23.72	3.65	18.55	10.51	6.19	8.33	170.38
Laupahoehoe	100	11.99	7.72	11.60	5.73	5.37	4.77	122.65
Ookala	400	3.89	6.40	7.09	4.08	4.04	4.84	92.93
Kukaiau	250	4.94	4.76	5.26	2.72	1.73	2.74	62.76
Paauhau Mill	300	2.99	3.28	2.10	1.12	0.49	1.58	35.20
Honokaa	470	3.61	3.92	1.83	1.36	1.08	1.96	44.19
Waimea	2720	2.34	2.78	2.38	3.02	2.50	2.55	34.39
Kohala Mission	521	5.13	3.57	4.68	1.63	2.88	2.17	50.16
Holualoa	1450	4.00	2.35	9.16	6.19	11.98	3.10	53.87
Kealakekua	1450	2.61	2.49	3.61	10.50	12.50	5.46	67.15
Naalehu	650	11.99	3.21	13.76	3.80	1.68	1.03	60.95
Pahala	850	10.57	7.14	18.96	7.33	8.96	0.58	81.89
Kilauea Crater	3984	12.90	5.04	25.79	11.27	14.16	2.98	123.24
Olaa, Puna	1530	15.83	2.89	29.50	18.73	11.32	9.84	214.78
Kapoho	110	12.15	3.85	26.65	7.24	15.50	5.47	127.72
MAUI								
Haleakala Ranch	2000	4.32	4.01	2.52	3.34	3.32	00	46.32
Pu'uomalei	1400	4.50	5.19	2.80	7.28	7.01	2.79	69.88
Makawao	1700	3.34	3.65	4.88	6.90	2.81	1.05	52.16
Erehwon	4200	3.12	4.07	2.12	3.87	8.34	6.02	37.40
Haiku	700	3.82	3.54	3.45	7.35	4.93	2.77	61.11
Keanae	1000	12.74	8.66	14.59	18.15	14.19	11.42	231.54
Nahiku	645	.....	.....	.....	.....	.....	.....	.....
Wailuku	250	2.36	3.85	3.38	2.76	0.77	0.22	22.58
Hana	145	4.55	5.00	3.65	8.87	3.88	1.49	55.46
OAHU								
U. S. Weather Bu...	108	8.37	2.05	15.87	1.61	1.65	0.56	41.04
Kinai Street	50	8.70	2.63	15.03	1.68	2.10	0.49	42.42
Woodlawn	300	10.71	3.00	17.22	9.00	8.98	3.59	107.95
Nuuau Elec. Stn...	405	12.55	3.21	23.57	10.93	11.70	4.98	132.29
Nuuau Water Wks...	881	16.67	4.14	31.40	15.93	18.91	8.60	183.71
Waimanalo	25	11.21	4.32	15.40	6.15	3.05	0.69	53.20
Maunawili	250	10.78	3.72	18.79	9.69	5.34	2.66	83.49
Waialua	30	8.64	3.59	7.88	4.92	5.50	1.51	46.49
Kahuku	25	11.45	2.67	15.30	2.39	1.67	4.15	56.72
Ewa	50	9.58	2.15	10.93	1.24	1.79	0.16	34.09
Leilehua	990	8.55	4.20	11.24	3.19	3.24	1.17	52.61
Wahiaawa	675	11.01	2.19	13.47	3.41	6.10	2.28	70.71
Ewa	200	10.26	2.54	16.16	2.27	3.87	1.98	53.38
KAUAI								
Lihue	200	6.68	4.98	14.14	3.69	6.49	2.31	70.67
Kealia	15	6.31	2.63	15.51	2.21	4.11	2.21	54.65
Kilauea	342	15.58	3.27	28.54	45.16	8.95	5.85	98.16
Eleele	150	5.95	2.73	9.33	5.71	1.40	0.38	43.65
Koloa	100	4.15	3.65	7.05	5.05	2.20	2.20	45.20
Waimea	30	5.87	3.20	9.15	2.60	1.40	00	29.67

Summary of Meteorological Observations, Honolulu, 1916-17.

Compiled from U. S. Weather Bureau Records, by A. M. Hamrick, Meteorologist.

(Continued from preceding Annuals.)

MONTH	BAROMETER		RAIN-FALL		REL. HUM.		TEMPERATURE		MEAN TEMPERATURE			Cloud Am't	Wind Velocity	
	8 a.m.	8 p.m.	8 a.m.	8 p.m.	Max.	Min.	6 a.m.	2 p.m.	9 p.m.	Mean. of Max. and Min.	—			
1916	July	30.06	30.05	1.72	67	83	67	73.5	80.5	75.2	75	3.9	8.2	
	August	30.07	30.06	1.09	66	69	69	73.2	80.3	75.0	76	4.3	8.2	
	September	30.03	30.02	0.60	64	67	84	70	73.7	80.6	75.9	77	4.7	7.6
	October	30.00	30.00	1.21	67	70	84	68	73.4	79.2	74.9	76	5.1	7.3
	November	30.07	30.06	1.31	67	70	83	64	72.2	77.9	73.9	74	5.7	8.7
	December	30.01	30.00	5.54	71	72	80	64	70.3	75.0	71.0	72	6.1	9.2
	January	29.99	29.97	8.37	73	75	79	59	67.6	73.7	69.4	69	4.8	8.1
	February	30.05	30.04	2.05	72	74	78	59	67.2	73.7	69.1	68	4.9	7.9
	March	30.05	30.04	15.87	73	73	81	62	69.0	74.7	70.7	72	6.9	7.7
	April	30.09	30.08	1.61	66	71	81	65	69.8	77.1	71.7	73	5.2	7.6
	May	30.08	30.07	1.65	66	71	84	66	17.7	78.9	73.3	75	4.4	6.4
	June	30.09	30.08	0.56	64	66	84	68	73.3	80.0	75.1	76	4.3	7.5
1917	Year	30.05	30.04	41.58	68.0	70.6	82.1	65.1	71.1	77.6	72.9	73.6	5.0	7.9

1916-1917

COMMERCIAL REVIEW, 1917.

THAT Honolulu is in the enjoyment of a season of prosperity is well borne out by a careful study of the custom tables of export and import for the past year, as shown on pages 21 to 23 inclusive, especially if they are compared with the figures of years preceding, and an analysis of the list of goods and merchandise imported and island products exported, will present lessons both encouraging and of timely caution.

All nature seems to have joined its forces to accord Hawaii the most prosperous year in its history, notwithstanding the reduced list of domestic exports. The aggregate total value of merchandise passing in and out of the territory has grown steadily for many years past till in 1917 it reached the sum of \$128,592,139, a gain over the preceding year of \$24,324,699.

In considering, first, the figures of export, it is a well known fact that to the bountiful yields of our sugar-cane and pineapple acreages, the high market rates realized throughout the year have enabled us to reach a total value of \$75,751,847 for the fiscal period ending with June, of which amount but \$1,836,435 represented returned mainland and foreign merchandise, leaving \$73,915,412 as the year's output of domestic produce. The above total for 1917 shows an improvement over the preceding year, which was our largest, of \$10,845,743.

The table of imports also naturally show increased figures owing to the steadily advancing prices throughout the year, due to the war and labor conditions. The total import value for 1917 of merchandise shipments from all points, is \$52,840,292, by far the largest in our commercial history; exceeding the previous year's imports, the banner year, by \$13,478,956, leaving a net gain in our commercial transactions for the period of \$22,911,555, a healthy showing, it will be admitted, yet considerably behind the excess of exports over imports of 1915, on its volume of business of \$91,139,425. See Table of Hawaii's Annual Trade Balance, on page 27.

The gain mentioned in the value of exports this last year is nearly covered by the increase in our two principal products, sugar and pineapples. Other lines showing improved figures embrace hides, honey, household effects, musical instruments, rice, sisal, vegetables and wool, most of which, however, are offset by the reduction in export values of animals, bananas, beeswax, coffee, lumber and tobacco. It is a matter of regret to note a set-back to any line in our list of domestic products, though these may be more apparent than real, a larger local consumption in some cases, and belated shipments of the season's product in others, accounting for the deficit, or affecting a moderation on like lines of imports. It is gratifying to see the substantial gain in the exports of sisal, wool, musical instruments, hides and skins, and to learn that the tobacco outlook is encouraging, not only to those concerned, but all advocates of diversified industries.

Of the various lines of imports, shown comparatively for 1916 and 1917, on pages 22 and 23, it is of interest to find that with the exception of household and personal effects, naval stores, phonographs, etc., refined sugar, and rubber belting and hose, the whole list shows increased values, a number of which are quite substantial.

An analysis of the list reveals a few points worthy of notice, first of which may be mentioned the fact that of the \$13,478,956 gain over the imports of the previous year, the increase is upon the lines of every-day requirement rather than of luxury. For instance: one turns instinctively to automobiles as an index, but this is found to have changed but little over that of 1916, whereas breadstuffs show a gain of \$1,079,-972, boots and shoes \$380,484, cotton wearing apparel \$1,-049,085, oils \$1,206,967, meat and dairy products \$465,050, fruits and nuts \$97,125.

In the several lines affecting construction work a number show large increased values, viz.: brass \$81,502, cement \$205,-907, copper \$67,047, electrical machinery \$487,090, glass and glassware \$112,590, iron and steel, etc., and machinery \$2,-

987,824, and lumber and building materials \$936,893, all of which would have shown heavier importations but for delays in the filling and delivery of orders. Among some of the advancing lines are: confectionery \$102,056, eggs \$28,302, (the year's supply being 358,206 dozen, valued at \$120,000), auto tires \$211,993, bicycles, motorcycles, etc., \$53,032, and fish (to a fish country, encouraged by exorbitant prices), \$70,407; these, like the above, being gains on like products for 1916.

Some modification prevails in a few items to the benefit of local products, more particularly coffee, certain lines of feed, and refined sugar, while a number of lines show reduced quantity though of increased value which may be understood as indicating cautious buying on a rising market.

Comment has been made from time to time on the shortsightedness; the lack of sound business principles observed by the importations of products that enter into competition with our own, to crowd them out of the market and discourage local enterprise, and endeavored thereby to instill a spirit of loyalty toward home industries for their encouragement. The wisdom of such a course was brought home to us forcibly this past year when advice from the highest official sources of the land went forth, 'to plant and produce all possible for ourselves instead of being a drain upon others'. In the spirit of preparedness, lest we should have too rude an awakening, some response has been made to this appeal, but it calls for all the support that is in our power to favor rather than discourage the movement. In a coffee country of such quality as is Hawaii's rightful boast, it is strange, to say the least, that this product continues from year to year among the imports. And the same applies to refined sugar now that several island mills are producing the refined product. The reduction of these in last year's imports, as already mentioned, is an encouragement.

Other items might be named but these suffice to illustrate the principle involved.

It would gladden eyes and hearts to see Kona oranges once more in the market, to displace the increasing importations of the California product for lack of them, which, for 1917, reached 53,964 boxes, valued at \$141,751. Encouraged local enterprise increases taxable property; extends our export list and values, and modifies those of importation.

THE HAWAIIAN PINEAPPLE INDUSTRY.*

BY J. P. MORGAN,

I. HISTORY OF THE INDUSTRY.

THE Hawaiian pineapple industry is distinctly a product of the 20th century. Seventeen years ago a group of Easterners sojourning on the Island of Oahu were struck with the adaptability of the soil, climate and labor conditions to the commercial growing of pineapples, which up to that time had received almost no attention. Captain John Kidwell, the pioneer of the pineapple industry in Hawaii, had already indicated the possibilities, and had, as manager of the Hawaiian Fruit and Packing Co., packed 13,798 cases between 1894 and 1899. The Pearl City Fruit Co., Ltd., was also in operation in 1900. In 1901 the Hawaiian Pineapple Co., Ltd., with a capital of \$20,000, was organized in Honolulu to produce and ship fresh and canned pineapples to the Pacific Coast. The pack of the first season amounted to 1,893 cases representing twelve months of very intense application to many problems which were new to the country and to the entrepreneurs. At the present day 1,900 cases can be packed by this same corporation in one hour and a half, so that it may be readily seen how great has been the development of the industry. The growth from 1903 has been rapid, as is evident

* A very complete paper on this subject, and same title, by Dr. A. Marques, may be found in the ANNUAL for 1909, pp. 58-82.

from the following table. The figures for the first three years are not absolutely accurate. Pack for the years, ending Dec. 31:

Year.	Cases.	Year.	Cases.	Year.	Cases.
1903	6,000	1908	391,082	1913	1,667,122
1904	20,000	1909	461,940	1914	2,268,781
1905	45,041	1910	544,968	1915	2,669,616
1906	74,245	1911	725,742	1916	2,609,483
1907	178,188	1912	1,313,363	1917 (Est.) .	2,600,000

As the demand for canned pineapple, stimulated by a carefully planned advertising campaign, spread from the Pacific Coast to the Eastern States, it became necessary to remove the cannery of the Hawaiian Pineapple Co., Ltd., which, until 1906, had been located in the midst of the pineapple fields at Wahiawa, 20 miles from Honolulu, to a position where the labor problem and the shipping facilities lent themselves more favorably to the business. In the meanwhile the success of the undertaking had attracted a good deal of competition, insofar that six other corporations were organized on the Island of Oahu and the Island of Maui. There are five main islands in the Hawaiian group, but pineapple growing has been successful on three of these only, viz.: Oahu with about 81%, Maui with about 14%, and Kauai with about 5% of the business. The greatly increased output now began to make itself felt on the mainland and the packers encountered their first serious economic problem of over-production. The industry has been strikingly free on the whole from difficulties of this nature, for it has never felt the pinch of tariff regulation or foreign competition. The problem of over-production, which was in a large measure really a question of under-consumption on the part of the public, was solved most efficaciously by a vigorous advertising campaign carried on through the large national weeklies and by grocery-store window display. At the present moment we are informed by the Association of Hawaiian Pineapple Packers that practically all the pack of the 1917 season has been disposed of at prices considerably advanced over those of last year's opening, so that it is obvious

that the pineapple has definitely taken its place along with canned peaches, cherries and apricots as a standard American fruit.

II. THE GROWING OF THE FRUIT.

The pineapple thrives best at an altitude of from 600 to 1,200 feet above the sea and thus utilizes land which is too high for Hawaiian sugar. It requires no irrigation because of the fact that it absorbs its required moisture from the air, or from frequent light rains. The planting of pineapples involves the usual operations of plowing, fertilizing, and cultivating, labor which is done almost entirely by Japanese, Chinese, and Portuguese laborers who earn from \$1.20 to \$2.50 per day.

The pineapple fruits 18 months after the planting and continues to bear every year, both fruit and "slips" from which new plantings are made. The variety cultivated in the Hawaiian Islands is exclusively Smooth Cayenne which of all the varieties is the most apt to be uniform in size, color, and texture of the sarcocarp. The plants are placed out in broad fields running sometimes four or five miles up into the foot-hills and are then kept free from weeds until about the third crop of fruit has been taken off, at which time the plants are rooted out and the land is planted in legumes as a revivifying rotation. Occasionally the plant and the fruit are disturbed by dry rot and mealy bugs, but on the whole the fruit is a very hardy one and is well protected by its thick skin from injury either by birds or in shipment.

Beginning about the first of July and running until the middle of September, the pineapples ripen and are ready either for the market or the cannery. Gangs of 20 or 30 men armed with short butcher knives and carrying-sacks, now go up and down the long lines of plants, gathering the fruit and putting it into boxes adapted to safe transportation. These boxes are then collected by auto trucks or broad mule-wagons, carried to the railroad loading-station and immediately sent to the packing house where they are frequently put into cans within 12

hours of the time they glistened in the field. In the case of the Hawaiian Pineapple Co., where the 6,000 acres of plantation are from 20 to 40 miles from the cannery, real problems of transportation arise on account of the necessity of moving the fruit at exactly the right time. Practically no loss on account of over-ripening is ever experienced, though a single carload of fruit, if allowed to stand a few hours too long on the side track, would involve the loss of from \$200 to \$500. The only carrying agent from the plantations to the canneries is the Oahu Railway & Land Co., a narrow-gauge railway operating chiefly from the sugar plantations but nevertheless deriving an income of several hundred thousand dollars a year from the pineapple industry.

The laborers on a pineapple plantation are almost altogether Orientals with overseers or "lunas" who are trained white men with experience in agriculture. The laborers live in little camps in gulches beside streams or wells to the number of perhaps 500 men and women. Their working day is from six in the morning to four or five in the afternoon, depending on the amount of work to be done. Labor problems as such have never troubled to any great extent either the sugar or the pineapple industries of the islands, although there is a considerable amount of shifting of individuals which sometimes entails a little worry especially at the cropping periods. It is fortunate that the pineapple season of picking is over before the grinding season for sugar commences and in that way both industries make use of the same labor to some extent.

A typical laborer earning say, $12\frac{1}{2}$ e an hour for a 10-hour day, or a net amount of around \$25 or \$30 a month, is able, if he be a frugal liver, to save all except about \$7 a month which is about the cost of food in the camp kitchens. Fuel, hot water, and houses are provided by the plantation and as in most cases the stores are six or ten miles from the camps, the laborer is enabled to send back to Japan, or to China, about two-thirds of his earnings. For the islands as a whole,

the amount thus returned to the Orient is between three and five million dollars a year. The Japanese laborers, who predominate in numbers, usually make their homes in the camps and have their wives and children with them. The Chinese on the other hand live as solitary individuals and very rarely identify themselves with any community life, going to town occasionally being their only indulgence apparently. There are instances of Chinese laborers having lived 30 miles from Honolulu without having gone to town once in two years. Medical service is usually provided by the employing company, though in cases where justice is best served the cost is charged back to the individual.

Occasionally heavy tropical rains wash out large areas of plantings or carry deep deposits of mud down from the hills, destroying several acres of fruit at one time. Ordinarily, however, even this expected disaster is guarded against by a carefully arranged system of drainage. So important is this matter of providing for the overflow of rain that the whole plantation is laid out so as to conform to the natural slopes of the land.

The employment of comparatively large resources enables the Hawaiian pineapple planter to avail himself of steam plows, caterpillar tractors and in some cases light movable railways, so that the production costs have been reduced to a minimum, and it has been pretty definitely settled that under these circumstances pineapples of a standard size can be grown for ten or eleven dollars per ton. In 1915, when the market was over-supplied, on account of the heavy carry-over of the preceding year, the value of a ton of pineapples fell as low as \$4.00. This represented a loss to small growers of between \$6.00 and \$8.00 and constituted a catastrophe which swept many little Japanese growers and a good many white homesteaders into bankruptcy. It was only the large capitalist who could survive such a storm, but probably on the whole the lesson was beneficial, inasmuch as it shook out a good bit of erroneous enthusiasm and served to put the industry on a more conservative basis. For instance, in 1914 everybody was pineapple-mad

and all the gulches and table lands were scratched up and planted. It was foreseen that trouble was coming, but the somewhat inelastic market failed to absorb the increased product when it appeared. At the present moment the growers of pineapple are said to be getting as high as \$23 a ton so that unless some unexpected setback occurs the 1918 season should help to rehabilitate those who lost money during the past depression.

One very expensive item in the growing of pineapple is fertilizer. The volcanic soils of the islands will produce plants with great luxuriance but on account of their comparative geological newness they have only a small content of leaf-mould and quickly lose their vitality unless renourished by phosphate and nitrogen applications. There are two large fertilizer companies in the islands producing commercial mixtures drawn largely from the guano islands of the South Pacific. These corporations were designed principally to supply the sugar plantations, although their special preparations for pineapple culture represent about \$50,000 a year.

III. THE CANNING OF THE FRUIT.

The pineapple is received at the cannery in lug boxes holding about eight fruits. It is unloaded from the trains on a large platform, segregated according to size and run through specially made shelling and coring machines invented by Mr. Henry Ginaca. From these it is conveyed on long belts, past girls and women who deftly cut any deep eyes that may not have been taken out by the machine. The golden fruit then goes through a slicing machine and is packed in cans according to grade, the qualifications of the finest class being richness of color, absolute ripeness, heavy content of juice and delicacy of fibre. Broken pieces are side-tracked into different varieties used as crushed or grated pineapple for pies and jams. The perfect product is placed in cans on small wooden trays and carried by speial trucks to the syruping machines which are exactly like those used in California fruit canneries. The

syrup now used is made from a solution of pure cane sugar sometimes mixed with the juice of the pineapple. Each can is automatically supplied with the requisite amount of syrup and is then carried on a conveyor to the steam cooker where it is sterilized before being capped. The double-seamer which puts the cap or lid on the can is the property of the American Can Company which leases its machines to the different canneries on about the same terms as are accorded to the California canneries. After this the can is conveyed through a second cooking machine and is then set out in the cooling room and flushed with fresh water from an artesian well. It sometimes happens that the very hot fruit in contact with the super-heated can is slightly burnt around the edges while standing after this second cooking and for this reason it is necessary to reduce the temperature as soon as possible. Automatic cooling machines have now almost entirely eliminated this danger.

After this the cans are taken to the lacquering machine where a special preparation is applied for the preservation of the tin. The cans are now ready for stacking in the warehouse where they will be held until a shipping order sends them off to New York or London.*

The first problem in canning pineapples is the sugar which is necessary in the preparation of the syrup. In 1916, canners sugar was selling at \$6.15 per bag of 100 pounds, as against a price of \$4.75 just before the European war, and for the 1917 pack the price was over \$7.00 per bag. This great increase usually has to be absorbed by the cannery and constitutes one of the chief concerns of the manufacturer. In a pack of a million cases of pineapple the amount of sugar used runs up to perhaps 2,000 tons and may be worth as much as \$250,000. From this it can be seen how important it is that

* Pineapple is packed in the following styles:

Sliced	Tidbits	Unsweetened Juice
Grated	Broken Slices	Cores
Crushed	Broken Pieces	Crushed Cores
Whole	Fans	Fingers
Dominoes	Confectioners' Sliced	Chunks

the making of the syrup should not involve any loss through over-cooking. One common source of constantly watched expense is the loss of sugar on account of oversugaring i. e. if a pineapple has reached a certain stage of ripeness it may not require exactly the same amount of added sweetness which a fruit less ripe would need, and in an outlay involving fifteen million cans it can easily be seen how an excess of sugar, however infinitesimal in each case, would in the gross run up in value to many thousands of dollars.

A second big problem is involved in the question of cans. In the Hawaiian Islands the American Can Company (the same corporation which supplies sardine cans in Maine and cherry cans in California) makes contracts with all the local cannerys for the season's needs at a differential price based on the market for tin plate. In 1916 the cost of tin cans in the Hawaiian Islands was about \$17.00 per thousand but for the 1917 pack we are informed that the pineapple cannerys have had to pay somewhere around \$20.00 to \$30.00 per thousand. As the cans enter the factory they are counted by a mechanical device and are stamped with a rubber stamp denoting the grade and variety of the contents. The factory of the can company is, in itself, a very interesting lay-out of complicated machinery representing a large investment. Here too the labor is chiefly performed by Orientals, although a large amount of the skilled attendance upon the machines requires a degree of intelligence directly reflected on the pay roll of the can factory. It frequently happens that pineapple, after having been stored for some time, or after having stood a long shipment, causes a loss from some faulty process in the canning factory and this loss is usually assumed by the canner, so that the wholesaler who buys the fruit is, on the whole, thoroughly protected in his purchases. The following sized cans are used:

Size.	Contents.	Approximate Net Weight of Contents
No. 10	6 cans per case.....	7 $\frac{1}{4}$ lbs.
2 $\frac{1}{2}$	24 " " "	32 oz.
2 squat	24 " " "	24 "
1 $\frac{1}{4}$	48 " " "	15 "
$\frac{3}{4}$	48 " " "	7 "
2 Tall	24 " " "	21 "
1 Buffet	48 " " "	9 "
1 Tall	48 " " "	15 "

Another problem involves shooks from which the wooden cases are made. These have to be imported from the coast and are usually bought somewhere around Puget Sound at a price fluctuating a little below .15c a case. To this question of a constantly disappearing supply of shooks the fruit canners of the Islands have given a good deal of thought in an endeavor to provide means for saving a part of their prime cost, some part of the freight both ways, and the repeated labor of making the shooks into cases. It has been proposed that on the high mountain ridges on the Island of Hawaii which raises its peaks 13,000 feet above the sea, and therefore supplies temperatures all the way from the normal heat of the tropics to the freezing point of perpetual snow, certain white pine or spruce trees be planted as an experiment, with the hope that some day a local supply of wood may be obtained and thus make the islands as a fruit-producing unit entirely independent of the freight conditions of the Pacific ocean and the supply depots of the mainland. Incidentally it might be possible to derive from this same source, sufficient lumber for the construction of the requisite crates for fresh pineapples and the lug-boxes in which the fruit is brought from the plantations; for these two branches of the business alone require somewhere around \$20,000 a year.

As suggestive of the wide range of commodities required before a can of fruit can be delivered to the customer, it should be noted that in some stage of the preparation the following constituents are needed:—(1) at the plantation; mule labor, fertilizer, cultivating machinery, field tools, camp provi-

sions, hauling trucks, lug-boxes, railroads, field and cost-accounting systems and watchful superintendence; (2) at the cannery; five or six types of complicated machinery, rubber gloves for the workers, steam for the cooking apparatus, tin cans, sugar, lacquer, labels, packing cases, nails, box printing machinery, storage facility, and insurance; (3) in shipment; proximity to steamship wharves, marine insurance, ocean freight charges, storage costs at San Francisco, an intricate selling organization on the mainland, advertising, sufficient profit for the wholesaler, the jobber, and the retailer, and a final landing of the fruit in the hands of the consumer at a price which will be commensurate with the value received. The high costs which the Hawaiian canner has to pay out as freight are in a measure compensated for by the reduced labor values which are somewhat lower than those prevailing in the canning industry on the Pacific Coast.

Average selling prices for 1917 canned pineapple are as follows:

2½ Extra Sliced	\$4.00	per case
2 squat Extra Sliced	3.40	" "
2 tall Extra Sliced	3.20	" "
1¼ flat Extra Sliced	5.60	" "
1 tall Extra Sliced	4.20	" "
1 buffet Extra Sliced	3.60	" "
10 (gallon) Extra Sliced	6.00	" "

IV. THE MARKETING OF THE FRUIT.

The problems of marketing have been much the same as those which are incident to the disposition of the product of any industry which is retailing a great variety of articles at a low unit price. It can be seen at first glance that great economies will result from whatever combinations, legally made, which will assist in the reduction of selling charges as between the original producer and the ultimate consumer. Working toward the solution of this very large question, the Association of Hawaiian Pineapple Packers has appointed a special committee to investigate the possibility of forming a selling body something like that of the orange growers of

California. This arrangement would eliminate a great deal of reduplication of work with many resultant economies. There are, however, a great many difficulties which seem to stand in the way of this happy solution. The great body of jobbers and wholesalers with whom, at the present time, the canners have all their dealings, depend in large measure for their profit on the business connections which they have throughout the country, connections which form a vital part of the whole system of distribution; and any disturbance of the equilibrium in this large and powerful body would at once raise a number of very serious sub-problems which it might be advisable to avoid. In other words, a re-organization of the whole system of canned fruit distribution might be involved in any attempt at the present time to tinker with conditions as they exist. By the Association of Hawaiian Pineapple Packers the problem in its entirety is being approached in an eclectic and theoretical manner with no special intention of disturbing the system of selling now prevalent in the United States. * * *

Summing up our brief study of the industry as it exists today we find that American skill and money have, in an entirely new field, demonstrated once again that when based upon an intelligent appreciation of the problems involved, there are ever recurring opportunities for healthy expansion. If it could be possible to put to some use during the winter months, say by the canning of some of the many fishes which find their habitat around the islands, the canneries which at present are used only for three or four months in the summer; or if some other tropical fruits could be canned with profit, the present industry would have still further stability. As it is, nevertheless, those men who have engaged in the industry, with sufficient capital to tide them over occasional lean years, and who are satisfied with a moderate though fair return, are firmly established in this outpost of American civilization and are rendering to the whole United States a genuine economic service.

PACK OF HAWAIIAN CANNED PINEAPPLE

Compiled from the Records of the Association of Hawaiian Pineapple Packers.

The annual packs of the different companies are indicated in the following schedule. In some cases the records are not available and estimates have been made, but as closely as can be determined these figures represent actual production.

	1903	1904	1905	1906	1907	1908	1909	1910	1911	1912	1913	1914	1915	1916
Hawaiian Pineapple Company	1,893	8,717	24,325	29,251	103,023	206,312	228,896	221,025	286,825	523,676	598,837	685,071	790,526	786,731
Haiku Fruit & Packing Company.....	1,587	4,373	10,653	23,597	55,224	69,047	86,486	100,409	100,178	140,600	207,216	182,951	144,462
Pearl City Fruit Company.....	16,343	20,341	21,013	46,737	47,289	42,316	31,825	80,352	84,451	93,533	115,747	69,790
Hawaiian Islands Packing Company.....	14,000	18,000	20,000	22,000	28,000	42,000	82,930	114,181	152,310	169,439	203,391
Kauai Fruit and Land Company.....	2,572	6,014	6,408	12,507	15,966	31,020	53,152	65,846	75,503	84,992
Thomas Pineapple Company.....	6,439	28,300	43,200	49,300	99,185	94,082	107,056	133,284	168,276
Libby, McNeill & Libby of Honolulu.....	28,774	49,456	141,318	223,555	491,639	605,717	579,913	.....
Maui Pineapple Company.....	2,660	8,268	25,177	46,270	80,682	98,363	97,156	.....
Hawaii Preserving Company	141,693	229,527	311,994	379,453	469,906	431,145	.....
Honolulu Ranch	5,975	9,180	18,222
Hawaiian Canneries Company.....	19,000	25,405	.....
Total number of cases for the respective years	725,742	1,313,363	1,667,122	2,268,781	2,669,616	2,609,483	.....

TABLE OF EXPORT VALUES PINEAPPLE PRODUCTS TO UNITED STATES, 1911-1917.

Compiled from Summary Foreign Commerce of U. S.

	1911	1912	1913	1914	1915	1916	1917
Fresh Pineapples	\$ 40,411	\$ 50,316	\$ 58,422	\$ 115,745	\$ 52,928	\$ 77,111	\$ 23,546
Canned Pineapples	2,020,800	2,567,564	3,566,201	4,536,919	5,986,190	6,547,053	7,970,522
Pineapple Juice	224,131	136,982	78,593	68,936	43,030	8,750	30,520
Total.....	\$2,284,342	\$2,754,862	\$3,703,216	\$4,721,600	\$6,082,148	\$6,632,914	\$8,024,588

PINEAPPLE COMPANIES OPERATING IN THE HAWAIIAN ISLANDS

Company:	Office Location:	Manager:	Representatives:
Hawaiian Canneries Co., Ltd.....	Kapaa, Kauai	Albert Horner	James F. Morgan & Co., Ltd., Honolulu
Kauai Fruit & Land Co., Ltd.....	Homestead, Kauai	W. D. McBryde	Kelly Clark, Seattle
Hawaii Preserving Co., Ltd.....	Honolulu, Oahu	Alfred W. Eames	Cal. Packing Corporation, San Francisco
Hawaiian Islands Packing Co., Ltd.....	Wahiawa, Oahu	Alfred W. Eames	Cal. Packing Corporation, San Francisco
Hawaiian Pineapple Co., Ltd.....	Honolulu, Oahu	James D. Dole	Hawn. Pineapple Co., Ltd., San Francisco
Libby, McNeill & Libby of Honolulu, Ltd.	Honolulu, Oahu	C. P. Judkins	Libby, McNeill & Libby, San Francisco
Pearl City Fruit Co., Ltd.....	Waiauwa, Oahu	A. E. Lister	T. H. Davies & Co., Honolulu
Thomas Pineapple Co., Ltd.....	Honolulu, Oahu	Will P. Thomas	J. K. Armsby Co., San Francisco
Haiku Fruit & Packing Co., Ltd.....	Haiku, Maui	W. A. Baldwin	Haiku Fruit & Packing Co., Ltd., San Francisco
Honolulu Ranch	Honolulu, Maui	D. T. Fleming	Alexander & Baldwin, Ltd., Honolulu
Maui Pineapple Co., Ltd.....	Pauwela, Maui	A. F. Tavares	Griffith-Durney Co., San Francisco

HAWAII'S AGRICULTURAL STRENGTH AND WEAKNESS.

BY F. G. KRAUSS.

“WE HOPE ultimately to double the average yield of our crops per acre; it will be a great achievement; but it is even more important to double the desirability, comfort and standing of the farmer's life.”

If we accept as a truism that “the advancement of agriculture and the betterment of rural life lie at the very root of the prosperity and strength of a nation,” then Hawaii is potentially strong, although in a sense already prosperous.

Secretary of Agriculture Houston has recently said “Today all the people urban and rural alike are keenly interested in the supply of the necessities of life and recognize the supreme importance of making agriculture efficient and profitable, and rural life comfortable, healthful, pleasurable and attractive. More attention and more intelligent thinking have been directed to the fundamental problems in rural economics in the last few years than in any preceding decade, and it may be safely asserted that in the last three years more significant legislative measures have been enacted or pushed further to the stage of completion than in any similar period in the history of the nation. It is vastly significant that attention is no longer exclusively directed merely to the primary problems of production important as these are. The center of interest, as a matter of fact has tended to shift, and the rural life problem has begun to be conceived, as it should be—as broad and complex, and withal fundamental to the well-being of the nation.

Obviously, there is more to rural life than the increase in production, and the finding of markets more than a matter of profits and even of justice in distribution; and to limit the attack of our problem merely to these phases of it is inadequate and wasteful. It becomes necessary to look at the side of our

national economy in its deeper aspects as well, and while not neglecting the older forms of activity to do all in our power to organize rural life, to develop the moral, the intellectual, and broader economic, governmental and social interests. For in the rural districts, no less than in the urban district, is it life, and that more abundantly which we are interested in, and to which all the material things must minister, and certainly the time has come to bring it about that all the fruits of modern civilization shall not accrue to the marts of trade. The neglect of rural life by the nation has not been conscious or willful. We have been so bent on building great industrial centers, in rivalling nations of the world not fortunately circumstanced agriculturally, in manufacturing, fostering it by every natural and artificial device we could think of—so busy trying to make each city larger by a half-million or more people for the next census, that we have overlooked the foundations of our industrial existence. And so, as the President has recently said, "It has singularly enough come to pass that we have allowed the industry of our farms to lag behind the other activities of the country in its development. * * * * Our thoughts may ordinarily be concentrated upon cities and the hives of industry; upon the cries of the crowded market place and the clangor of the factory, but it is from the quiet interspaces of the open valleys and the free hillsides that we draw the sources of life and prosperity. Without these every street would be silent, every office deserted, every factory fallen into disrepair."

The time would seem to have arrived in Hawaii no less than on the mainland, when more serious consideration should be given to the problems of farm life than in the past. We may well say with ex-President Roosevelt, "The problems of farm life have received very little consideration and the results have been bad for those who dwell in the open country, and therefore bad for the whole nation * * * it still remains true that our whole national system rests upon the farm, the wel-

fare of the whole community depends upon the welfare of the farmer. The strengthening of country life is the strengthening of the whole nation."

It is only through earnest study and resolute action co-operatively asserted on the part of all concerned that a satisfactory solution of our complex rural problems can be brought about. It is through the lack of such constructive concerted study and action that Hawaii today shows her greatest weakness in the midst of an unprecedented material prosperity. Today, the small independent farmer, and the free lands of the government, whence should spring a strong and intelligent citizenship—the agricultural people who have ever constituted the foundation of our national strength and efficiency, if we desire to remain an independent nation, have received but scant consideration in the past.

No strong leadership has as yet arisen to direct and further the peopling of our government lands with a desirable citizenship, and to advance fairly the interests of the common people of the open country, of whom it is true there are as yet very few in Hawaii. If what we state is true and if therein there lies the weakness of our commonwealth which we assert,—then, lest we be misunderstood, should it be stated in justice to all concerned, that our inaction is probably due not to wilful or conscious suppression, but rather to thoughtlessness and ignorance of the fundamental laws of rural economics. When a people are as prosperous as we have been they are not prone to give much heed of the seemingly distant future, and "leaving well enough alone" seems a safe procedure. We are not of the radicals who would condemn our fellows whose thoughts and actions may run counter to our own. We believe that most men act according to their light, and if any have seemed to thwart our plans, arrayed against their own, they may have acted with the same earnestness of purpose as did we. We do not believe that any great and permanent reform can be brought about on the hypothesis that the other fellows are designing rascals and to proceed on this basis before we have

proof. We do not believe that the ordinary "investigation" of our problem of land settlement will get us anywhere. What is needed at this time is a serious and thorough study of our land question by a competent body of broad-minded men who have only the permanent welfare of the community at heart. When adequate facts have been assembled to justify a complete analysis of the situation, we may proceed to recommend to the President and Congress that legislation be enacted to safeguard the rights of the people. These are the safe and logical means now being pursued by our Federal Trade Commission in determining the status of our great commercial operations during this the great crisis of our generation.

In discussing our weakness, no less than our prosperity, let us remember that our whole economic system has been undergoing a complete and fundamental change. This has resulted in profound social changes, and the re-direction of many of our points of view. In some occupations the readjustment to the new conditions has been rapid and complete; in others it has come with difficulty. In all the great series of farm occupations the readjustment has been tardy, because the whole structure of a traditional and fundamental system has been involved. It is not strange, therefore, that development is still arrested in certain respects, that marked inequalities have arisen, or that positive injustice may prevail even to a marked and widespread extent. All these difficulties are the result of an unequal development of our contemporary civilization. All this may come about without any intention on the part of anyone that it should be so. The problems are nevertheless just as real, and they must be studied and remedies must be found.

In closing this simple though not unimportant text, the writer cannot refrain, at this time of deep concern, to recall the illustrious words of Garfield, that—"At the head of all the sciences and arts, at the head of civilization and progress, stands—not militarism, the science that kills, not commerce, the art that accumulates wealth—but *Agriculture*, the mother of all industry, and the maintainer of human life."

HAWAII IN WAR TIME.

BY ARTHUR JOHNSTONE.

NESTLING in the depths of the Pacific, Hawaii labors apace and dreams withal. Nor does she work and dream in vain. Her canefields fill her mighty warehouses with shiploads of sugar, and her dreams of home and of the outer world mostly come true, because they are founded on mental realities and material facts. Situated by geographical fate so that the Eight Islands are sea-girt by varying thousands of miles from the surrounding civilization or barbarism, as happens, her only means of communication with the world are by sea or cable. Her nearest continental landfall lies east by north more than two thousand miles away. Hence, as modern science points out, our position and semi-isolation have had much to do, during the past century, with the development and progress of island life; in truth our ethnographical situation has directly and continuously affected our material progress and mental culture. Among other traits, it is a fact frequently noted by strangers, that the mental point of view of our people has an unusually wide angle when brought to bear on the political, social, and economic conditions of the far-away world. The cause of this intellectual breadth is that as a people the islanders have learned to observe from a distance, and hence more critically, the affairs of those of the outside world. Thus they have learned to judge without the prejudice of part-takers, and it follows that their observations in general have been of a judicially exact and sober order, as they continue to be.

It is a fact, also, that it was early in their national life when the islanders began acquaintance with the men of civilization. Their tuition began with the pricking of the too fre-

quent diplomatic bubbles which were blown for their savage admiration — and subsequent downfall. It is true that the demolition of these political schemes was not accomplished without the aid of their early American friends, who were wise in their generation, and whose progeny have inherited their wisdom and patriotism even to this day. In consequence of such an experience as this, the islanders have acquired a habit of thought and action which has nurtured, and at the same time guarded, our culture and progress ever since. It will not be surprising, then, that when this great world-war was imminent and threatening, that Hawaii should view it with a sober eye. When it burst in full fury by the deliberate invasion of a weak neutral state, our people at once branded the Germans as a nation degenerate, as moral dastards dishonored in the present generation, and, perhaps, beyond redemption—a view which, in the fourth year of the war, is justly held by all nations, except the Huns and their congeners, the infamous Turks. At this point the pretexts of international politicians and diplomats disturb us not. The namby-pamby of ultra-altruism touches not our hearts. The cries and illusions of the peacemakers we heed not at all, for our duty and our forward way is pointed out by the truthful observation of provable facts, and by the light of a patriotism that never fails.

In Hawaii our people have learned well their lesson from human nature, namely, that the world's kings have taught their subjects that the man-power of the nation is to be wasted, whenever necessary, for the elevation of royalty and wealth; but that Democracy has always taught and still teaches that the man-power of nations must be conserved at all times for the elevation of the states themselves, for the advancement of the individuals composing them, and hence for the amelioration of mankind at large. The kingly state is now viewed, with few exceptions, as a useless by-product of the political past, an unsaleable commodity which has become worthless

with the "rise of man". Men the world over now see that the great patchwork of human aims, political systems, social institutions, and widespread superstitions, called civilization—out of which our human progress slowly emerges after finite pains and lifelong struggles — is but an aggregate result of a conflict for supremacy between social and political conditions, and practical reason. In the past century reason, the world over, has proved its fitness by victory over the emotional nature of men, and at the present time the light of mental progress is driving away the long twilight of unverified political and religious systems and beliefs. This has resulted in shaking the foundations of authority and belief the world over, and especially to the consternation of those two extremes of human government called autoeracies and European Socialism, neither of which systems upon test are found to square with or fit into the democracies of freedom. It is to the praise of Hawaii that such fundamental social facts, among others as necessary, have been recognized here since the introduction of civilization in the year 1820, or thereabout.

In wartime all things change. The abnormal literature of namby-pamby arises wherever the emotions of men, either through ignorance or unbalanced temperament, gain the control over their reason, judgment, and the general principle of human justice which should inhere in all of our actions. In Germany this took on the assumption of "God control", whatever that may mean, and otherwise she developed the evil form of senseless hatred or the "strafing" of the free peoples whom she has since sought to conquer or destroy. In England and France events came on so rapidly when the war broke, that namby-pamby found but little chance of organizing its mawkish sentimentality against national safety. But in the United States, where things take shape on the large scale, and where the enervations of prolonged peace and material wealth had extolled ultra-altruistic sentiment, the foolish ideals of the namby-pambyists and pacifists were soon exalted to the temporary exclusion of the stern realities of life and the still sterner

reality of the manhood of the nation. An injury to the habitual patriotism of America was the result which has been counteracted only after a year's active preparation for the coming conflict. This wave of evil which swept across the country officially and unofficially, and which was backed by hyphenates and Germans generally, was started by Wm. J. Bryan and his namby-pamby following enlisted from church, political, and educational factions, and also from the pacifists and others in sympathy with the enemies of the entente cause and freedom. A change of heart is said to have come at a late hour to Mr. Bryan and, hence, to some of his followers, but this of course does not cure the mental deficiency which led them to become for the time traitors to humanity in general and democracy in particular.

This wave of Bryanism and ultra-altruism reached Hawaii early after the war began, but it was quite barren of results here. Never for a moment did our island people hesitate in either their patriotic or humanitarian duties. By that time we were already at work and were raising funds to aid the stricken Belgians, the patriotic French, the British soldiers, and the Red Cross. Nor did Hawaii refuse, where they were offered, to forward contributions to the shameless Germans who were already busily perpetrating shameful and nameless atrocities on every battle-front in Europe and, wherever it was possible, at sea. In fact the many good works of the men, women and children of the islands have been carried on throughout nearly four years of death and destruction. They will be so continued until the defeat and overthrow of the Central Allies is complete; and it will not be complete until their people have learned the lesson of Germany's responsibility for this uncalled for and bitter war. As time runs the war work in the islands increases and widens, until now, with our own army and navy already in the struggle, it again doubles and triples, with the end not yet in sight. The Red Cross in Honolulu alone has a membership of nearly twenty thousand, and is rapidly spreading to the central districts of the outlying islands, where the

good work is being urged forward. One of the creditable directions which our local war work has taken is the raising of individual funds to be applied for conserving the lives of the orphan children of France, and providing for their maintenance until better times. This may be considered as the real and ideal succor of whatever gods there may be.

When the United States declared war Hawaii had already its quota of the national guard well filled, and in consequence has received at different times compliments from Army headquarters for our spirit of preparedness. Indeed the interest taken in military affairs here during late years, and the enthusiasm shown by our local officers in securing the efficiency of the guard, is well known; and now that our war bugles are blowing from afar, our interest grows more intense since we now have large numbers training in the reserve camps under the regular army officers. In preparation for the draft Hawaii has done her duty by giving a full registration with the fewest number of slackers. This fact, after our very cosmopolitan citizenship is considered, is quite remarkable, since our allotted quota of troops under the draft is out of comparison to the number of Americans in the islands. Another noteworthy fact is the enthusiasm shown by the Japanese boys born here, who have raised a full company for the national guard. Of the British colony little needs to be said, since their well-known traits of fervid patriotism and daring-to-do-things, quite equal those of their American cousins in quality and in scope of action. Hence it surprises no one that the colony has sent to the front a large portion of its available men.

The promptness and unity of Hawaiian action is of course largely due to our geographical habitat and semi-isolation, as before mentioned, as is also our rather emphatic viewpoint of this unjust and infernal German war, which has wrecked so much of the well-earned peace of unoffending nations. We have long accustomed ourselves in Hawaii to make sacrifices for the public good or for those in need. Since the times of

the early missionaries to the present many sacrifices of the best things attainable in life have been willingly made. The enjoyments of peoples more favorably situated have not been ours; yet the islanders have nevertheless taken a very wholesome if sober view of the pleasures of the outer world, and have fortunately learned, at the same time, to call both its joys and evils by their proper names. The joys of life, whereof we have missed many, seem to be enhanced mayhap, but at the same time we are aware that we have also missed many of life's evils which are unregretted, if not altogether unknown. Slow to believe evil of our fellow men, we held judgment in abeyance when first we began to hear of the evil doings of Germany and the Germans in the war. At first the Germans blamed it all to the "lying English slanderers". But before long the evidence began to accumulate from such reliable sources, and to such a degree, that even the German government ceased almost wholly to make denials; but as a counter-defence began sending periodic dispatches containing vaguely stated charges of atrocities alleged to have been made by the entente allies against the Germans. Think of that! and compare it mentally with the past four years of the idiotic diplomacy of the Germans, which has at last happily fetched them to the beginning of a humiliating end, with the accompanying imminent downfall of the worst autoeracy that has ever damned the prosperity of a brave people.

Yet the Hawaiians, like the bulk of free men, have not much sympathy for the German people, and they certainly have far less for the Hohenzollern dynasty. There are ample reasons for this widely distributed resentment by the men of the free nations; and right here inexorable logic compels informed minds to obliterate for once and all that foolish theoretical distinction which altruism and namby-pamby have attempted to make between the Prussian Government and the German people. Practical reason demands that where a government, after four decades of secret preparation, becomes guilty of a policy of international aggression and general evil, that its

subjects who have backed with treasure and men its ruthless and shameful course during three years of open warfare and oppression, are equally guilty and criminal in practice. To assert now, with the inevitable defeat of the Central Allies in sight, that there is a discernible cleavage between the German people and their government, is of no avail; for this people would have followed their Prussian Government to victory with cheers and shouts, just as they must soon go with it to defeat, but with their cheers changed rather to curses fervent and deep. There is another evil phase among the many of this unjust war, wherein the subjects of the Kaiser must bear with him great moral odium. The entire nation, with the Kaiser, has trusted in and believed that the power of a Prussian lie persistently told would benefit and advance German interests, and would, from its point of view, therefore be justifiable; this doctrine the German people have endorsed heartily to the present moment, nay, they have individually aided it by wide and vigorous propagandas to influence or deceive the scattered nations of the earth. It matters not that the German people were in their turn fooled by their government. The truth stands that they were morally bound to investigate for themselves in so deeply serious and criminal a business as the waging of world-war. Hence even in trusting the Kaiser blindly—whereof there is little or no evidence—they have shouldered the national responsibility of his schemes and of the horrible crimes committed against humanity by their government. Yet this “simple German people” has the shamefast nerve to ask with a show of hypocritical tears, Why is all the world against Germany? The answer is as “simple” as the Germans claim to be: Because the outlaw hand of Germany and the Germans has been raised against the freedom of humanity by making a war of conquest against the free nations of earth.

The voice of the west is raised for liberty and democracy from the Canadian forests in the north to the sunlit savannas of South America, from the frozen heights of Alaska and

British Columbia to the Christmas gardens of Hawaii and Australia. Where the seven seas join and end, the stars of Liberty are kept shining in the infinite sky of Freedom by millions of finite men. Where her stars shine on the brow of the world her glory shall increase until at last the nations shall forget even the names of the kings, the tyrants and the priests who have troubled and delayed the progress of mankind to freedom. Those rulers of earth who have hitherto opposed the political and social rise of man have already received their reward—the curses of a wiser posterity. The few who are now trying to abridge the liberty of men and nations shall soon receive their reward—the just reward of a national humiliation and defeat at the hands of the democratic spirit of the age. So it happens that the love and admiration of we Hawaiians turns, and justly turns, to the nations of brave men who are fighting for world-liberty against

“The Wolfmen, dread Wolfmen! O the Teutons and the Turks!
Beneath whose cruel banners Earth’s direst evil lurks.”

Of all the hosts now fighting for liberty, we know best the traits and characters of the French and English, the Canadians and Americans, the Italians and Australians, but we always return to the French, the English and the Americans as representing the typical elements of the war. Yet we are sure that as Americans—and hence as Hawaiians—we feel that we are much nearer to England than to the rest of the entente allies; for are we not very largely flesh of her flesh and bone of her bone? And have we not been so ever since the days of the revolutionary war, when our cannon thundered defiance to the mother nation? In war time, then, we are warranted in calling ourselves the first cousins of the English, by the light of our similar social and political institutions, and by our community of love for fair-play and equal justice to all men. Such traits have always dominated the Americans and English in their dealings with the world at large. Let us all then together, Canadians, Americans and Australians, hail the

mother-country from afar, and let us shout our war-time greetings in the united Voice of the West:

O mother of great nations, staunch and free
Our England stands before the foes of Man!
The Imperial Teuton daunts her not, nor can
His ruthless Huns and barbarous Turks decree
The wreck of Freedom which he longs to see.
His well-planned lapse to savagery began
Too late. Democracy hath placed her ban
On Power; saith all are heirs to liberty,
And pointeth calmly to the radiant West
Where England's children by new millions spring,
All clad in garments which have made them blest.
Ah! mother of our nations, here we sing
Of thee, and o'er far seas hear now our cry,
Yea, we will stand by thee, by thee will die!

THE RED CROSS IN HAWAII.

SHORTLY after the outbreak of the Great War the need was felt of some definite channel through which monies could be forwarded to the stricken countries and as a result the War Relief Committee was formed, headed by Mr. W. R. Castle. This Committee did very little actual soliciting but through its means \$154,054.00 was sent on prior to July 1st of 1917, the great majority going to the Allied countries. The Committee in each instance forwarded the cash in accordance with the instructions of the donor, unless no instructions were given, in which case the Committee sent the funds to those countries appearing most in need of assistance. France, Armenia, and Serbia were among the large beneficiaries.

Following the War Relief Committee the Hawaiian Allied War Relief was organized. The purpose of this work was the manufacture and forwarding of supplies of all sorts to the Allies. It made no pretence of being neutral, and Hawaii early showed its sympathies by the enthusiastic support given this organization by the ladies of the community. Units were

established on the various Islands, headquarters being at Honolulu. Supplies were shipped through the War Relief Clearing House, with headquarters in Paris and New York. Cases of supplies from Hawaii were a welcome sight at the front therefore in the early part of the year. Miss Beatrice Castle and Mrs. Henry Damon have been the active heads of this work, supported by a most loyal band of assistants.

Classes in first aid have been conducted under the leadership of Mrs. G. P. Wilder, who has been most enthusiastic in all her Red Cross work.

With America's entry into the war there was of necessity a change throughout the Territory. A chapter was formed in Hilo with jurisdiction over the Island of Hawaii. The Reverend Mr. Bodel is its president. An auxiliary was formed at Lihue, Kanai, with Mrs. Charles Rice at its head. This auxiliary, besides doing its regular work, held a membership drive on July 4th, bringing in some 600 members.

In Honolulu at the end of June the War Relief Committee became an auxiliary of the American Red Cross, and in September a chapter, under the name "Honolulu Hawaii Chapter", with jurisdiction over the Island of Oahu. Its officers are E. D. Tenney, Chairman; George R. Carter, Vice-Chairman; C. H. Cooke, Treasurer, and A. L. Castle, Secretary and Executive Officer. Arrangements were perfected to make use of the splendid organization of the Hawaiian Allied War Relief, rather than to start separate auxiliaries. Under the arrangement that organization became an auxiliary of the Honolulu Hawaii Chapter, by special permission of the American Red Cross, its supplies being shipped to the Red Cross Supply Depot in New York City. This gave to the English and Scotch ladies, who have loyally stood by the Hawaiian Allied War Relief in its change to the American Red Cross, assurance that the supplies would be used where most needed at the Allied front. This work is now carried on in the old Throne Room of the Capitol, where surgical dressings are made, at Beretania and Miller streets, headquarters for hospital gar-

ments, and at the various units on Hawaii and Kauai. A handsome Red Cross flag was presented to this organization by the late Queen Liliuokalani, whose interest in Red Cross work in her last days was most touching. One of her last acts was to be wheeled on to her veranda on the day of the Red Cross drive and to take out a Patron membership.

The work in Honolulu is now well systematized. The Chapter handles all donations. It seemed best to try for monthly donations rather than to rely on special drives for money. As a result of steady work and the natural generosity of Honolulu firms, corporations, and individuals, the Chapter's income is running over \$15,000.00 per month, the regular pledges being in various amounts from \$1.00 up to approximately \$1,000.00 each month. This money is used first to pay the bills of the Hawaiian Allied War Relief for surgical supplies and hospital garments, and the present balance goes direct to the American Red Cross War Fund, administered by a council in Washington, up to the end of November some \$71,000.00 having been remitted. Through the foresight of T. H. Davies & Co. of Honolulu the supplies purchased by the Hawaiian Allied War Relief have been very reasonable, comparatively. Money is forwarded by the Bank of Hawaii without charge, and goods are carried by the Matson Navigation Company free. From now on a certain amount of money will have to be held in reserve for Relief purposes with more and more Hawaiians going into active service, as aid to needy families as a result of any casualty must come, temporarily at least, from the Red Cross. In this connection a Bureau of War Records has been opened to keep track of all residents of Hawaii in active service with the Allied Armies.

The work on the Island of Maui is conducted along similar lines to that of Honolulu, Mrs. Frank Baldwin heading an auxiliary at large, called the Maui Auxiliary. The Island is divided into districts and the work, both as to supplies and cash donations, is being handled efficiently. This auxiliary works in cooperation with the Honolulu Hawaii Chapter, and

the Kauai shipments are also handled through Honolulu.

On September 29th in Honolulu occurred a mammoth membership drive. The city was divided into three main divisions, two handled wholly by the ladies, and the business section by the Honolulu Ad Club. In addition there was a Japanese Committee headed by Consul-General Moroi and a strong Chinese Committee. In the outside district every part of the Island was covered by district leaders. The result was rather surprising. In one day 16,332 members were enrolled, or one-sixth of the entire population of the Island, membership including 24 Patron and 442 Life members, netting some \$38,500.00. The portion of dues sent to division headquarters in San Francisco was \$27,430.00.

The scope of this article does not permit one to touch on outside activities or to cover all people in Red Cross work, but mention should be made of the work of the Navy League, who are now assisting the Red Cross; that of Miss Wilhelmina Tenney and Miss Elsie Wilcox in the Red Cross canteen work in France; that of ten young men who are now with the United States Medical Corps as ambulance drivers; that of W. R. Castle, Jr., at the head of the Bureau of Information of Casualties for the American Red Cross in Washington, and that of ten Red Cross nurses who at the end of November were momentarily expecting orders to proceed to the front.

THROUGH the searchings of the Federal Experiment Station, in the interest of Hawaii, there has been received recently a consignment of algaroba seeds from South America, apparently the pure strain, resembling the local product, and strengthening the impression as to that country being the probable source, or origin, of the algaroba of these islands.

THE third and closing portion of the first volume of the "Fornander Collection of Folk-lore," with copious index, forming Volume IV of the Bishop Museum Memoirs, is nearly through the press, to be followed in due time by two more series, or volumes, to complete the collection.

EARLY DAYS IN THE REIGN OF KAMEHA-MEHA IV.

HONOLULU REMINISCENCES OF THOMAS G. THRUM.

Continued by request.

BRIEF mention was made in my closing paper of 1853-54* of the favorable impression made by Kamehameha IV. in his inaugural address at Kawaiahao church, which ceremonies took place at noon of January 11th, 1855, the day following the funeral of good King Kanikeaouli, Kamehameha III. As may be readily understood the event drew out a vast concourse of people that filled the building within and crowded it without. To the outside multitude an address in Hawaiian was given from the steps of the edifice at the close of the church ceremonies of reading the last will of his late majesty and taking the oath of office. This seal of the covenant, as we may say, complied with, was followed by an address in both English and Hawaiian languages (for the king was a fluent speaker and accomplished English scholar), that carried the impression of sincerity in his high aims for an administration worthy the ideals of present-day civilization and progress. He instanced this as a new era and a critical period in the country's history but it was not a time to despair. Promising a mild and liberal government "with sufficient vigor to maintain the laws securing rights of persons and property and not too feeble to withstand the assaults of faction" he looked to the people for aid in maintaining the constitution, supporting the laws and upholding our independence. Reference was made to his predecessors as "preeminently the friends of the foreigner", and said further:

"To be kind and generous to the foreigner, to trust and confide in him is no new thing in the history of our race.

* See ANNUAL, 1915, p. 61.

It is an inheritance to us from our forefathers. * * * I cannot fail to heed their example. I therefore say to the foreigner that he is welcome. He is welcome to our shores—welcome so long as he comes with the laudable motive of promoting his own interests and at the same time respecting those of his neighbor. But if he comes here with no more exalted motive than that of building up his own interests at the expense of the native—to seek our confidence only to betray it—with no higher ambition than that of overthrowing our government and introducing anarchy, confusion and bloodshed—then is he most unwelcome."

The town was not wanting in those days of a coterie of narrow-minded individuals who not only failed to appreciate the aloha basis of this public expression of Hawaii's new king, but sought to thwart its purpose of good-will by magnifying the string tied thereto by harping on the unwelcome strain. How much of this spirit emanated from sympathizers if not aiders and abettors of the late contemplated filibuster scheme¹ to capture the islands I know not, but there was doubtless a connection, and the king being well aware of this, as also the "near" annexation project² of 1853, we can readily see and appreciate the point of this royal utterance.

Captain Tom Spenceer, ship chandler and well-known character of Honolulu, hale fellow well met with royalty and other high dignitaries, used to say that he was the one entitled to the credit for blocking the annexation project above referred to, by his advising Liholiho (then prince and heir), against signing away his rights, and remaining away on the other islands to be free from court and official influences "till the clouds rolled by". Staunch American though Captain Spenceer was ever known to be, he took pride in this stand at that time in favor of Hawaiian monarchial rule.

The only change made by Kamehameha IV^{*} on announcing his new cabinet was in the appointment of his sister Princess

¹ ANNUAL, 1915, p. 49.

² Ibid, p. 47.

Victoria Kamamalu as Kuhina Nui, in place of Keoni Ana. The cabinet therefore consisted of:

- R. C. Wyllie, Minister of Foreign Affairs.
- E. H. Allen, Minister of Finance.
- John Young, Minister of the Interior.
- R. Armstrong, Minister of Public Instruction.

Hon. Wm. L. Lee was retained as Chancellor of the kingdom, though through impaired health he had tendered his resignation as chief justice the early part of the preceding month, only to receive a very gracious and solicitous letter from the king, supported by the Cabinet and the Bar association, requesting its withdrawal, and seek to regain his health by a change of clime and scene as a duty he owed both the nation and himself, "that I may long be happy in your services".

A change took place in the Supreme Bench at the opening of the year by the appointment of Hon. Geo. M. Robertson (father of the present chief justice), as associate justice in place of Hon. L. Andrews, who was commissioned judge of probate.

In March, Judge Lee left for Washington, as the king's envoy extraordinary and minister plenipotentiary, empowered to negotiate a treaty of reciprocity between the two countries. The Judge was highly successful in this mission, notwithstanding his severe indisposition, but twenty years passed before the senate set its approval on such closer commercial relations with Hawaii.

The regular session of the legislature of 1855 convened April 7th. Hon. G. M. Robertson was one of the members representing Honolulu, and was elected speaker of the house, and O. H. Gulick was chosen clerk, and is the only survivor of Kamehameha IVth's first legislature. Things did not run smoothly in the consideration of financial matters between the two houses so that they came to a dead-lock; the lower house refusing to confer with the nobles on the appropriation bill. His majesty therefore dismissed the body, June 10th, and

ordered a new election. On the extraordinary session convening, July 30th, the assembly was plainly told by the king it had but the appropriation bill to deal with, and to confine expenditures to the estimated revenue. "It is useless", he said, "to make appropriations for appearance sake that will not, because they cannot be acted on". On completing their labors the sum total of the appropriations amounted to \$447,933.73 for the annual term.

The day following the above straight talk to the law makers the king shone forth in a new role as a true friend of the seafaring class of the community in his address on the occasion of laying the corner stone of the Sailor's Home, an appropriate event in the observance of the national holiday, July 31st, commemorating the restoration of the Hawaiian flag by Admiral Thomas, twelve years before, that had been so unjustly lowered the early part of the year by Lord George Paulet, for alleged wrongs to British subjects.

His majesty on this occasion spoke as follows:

"The laying of the corner stone of an edifice destined to add to the welfare and happiness of seamen is an occasion interesting to every member of this community. The hardships with which the sailor contends, and the dangers which he braves brings us ease and security. Had he never steered his ship into our waters, Honolulu might simply have retained its position as a fishing village or become by this time a deserted beach. I hope the day has passed for any class of men to be valued only for their strength and adaptability to the purposes of others. The sailor, the miner, the seamstress, and even the slave, for generations to come, will all have cause to bless the Nineteenth Century. In raising this Home, we endeavor to act in accordance with the Spirit of the Age, by seeking to ameliorate the condition of a preponderating element of our foreign and a very considerable one of our native population.

The moral wants of the sailor demand our care equally with those that are physical. The facilities offered to him on shore as a reasonable and responsible being should be multiform, in order to counteract the disadvantages inseparable from

a life at sea. For his own sake, and that of every community he visits, he should ever be found an orderly and intelligent member of society; institutions of this character will help to make him so. Entertaining these feelings toward sailors, I did not hesitate to assist in the ceremony of today, and I esteem myself happy that my name is associated with this good work."

The address of the President of the Society, Hon. E. H. Allen, was one of special historic interest touching the conditions and needs of seamen at this port that had met so generous a response for their amelioration, not only throughout the islands, but in sea-ports abroad that had reaped Honolulu benefits in days gone by, so as to encourage the trustees in hastening forward the project.

In proof of this statement the Home opened for service in just thirteen months from the laying of the corner stone. The ground for the enterprise was granted by King Kamehameha III in privy council, and occupied the corner of Bethel and Merchant streets, the site now of the Yokohama Specie Bank. The building was an L shaped, three-story wooden structure, with protection and comfort of verandas front and back; all slate roofed. Chas. W. Vincent was the contractor for its erection.

Through Rev. S. C. Damon, Seamen's Chaplain and indefatigable worker for the interests of "those who go down to the sea in ships", the Thrum family was closely identified with the opening and early years of the Honolulu Sailor's Home, but this is not the time or place to deal with its history, much less intrude personalities in connection therewith, except to show its efficient first Board of Trustees and Officers. There were eighteen trustees, comprising: E. H. Allen, R. Armstrong, I. Bartlett, C. H. Butler, W. St. M. Bingham, S. N. Castle, as first class; S. C. Damon, R. G. Davis, John Ii, G. B. C. Ingraham, W. Johnson, G. P. Judd, as second class, and W. L. Lee, W. Newcomb, G. M. Robertson, T. Spencer, J. T.

Waterhouse and H. M. Whitney, as third class. Of these the following were chosen its officers:

Hon. Elisha H. Allen, President.

G. P. Judd, M.D., Vice-President.

Wm. St. M. Bingham, Secretary.

G. M. Robertson, Treasurer.

Rev. S. C. Damon, Wm. H. Johnson and I. Bartlett, Executive Committee.

In June of 1855, Honolulu was called to mourn the death of Hon. A. Paki, termed "the last of the family of old high chiefs", whose ancestors belonged to the Kamehameha and Kiwalao families. He was born on the island of Molokai about the year 1808, hence not far from 47 years of age at the time of his death. He was a man of commanding presence, fully six feet in height, intelligent in countenance and of ehu (very light) complexion. In addition to his high rank, or by virtue thereof, he held various important official positions, for he was esteemed for his high character and firmness. Naturally he was much lamented by a wide circle of friends, both foreign and native, and particularly by the chiefs. Konia, his wife, survived him but two years.

A movement was started in the summer of 1855 to obtain funds for the erection of a monument to the memory of Kamehameha III. A meeting of organization was held at which Prince Lot Kamehameha was chosen president of the association—as it called itself—C. G. Hopkins, secretary, and E. H. Allen treasurer. It was weighted down by several vice-presidents, an executive committee of four, and an agent in each district to collect subscriptions and turn in to the treasurer. Thus organized, and the sum of \$2000. subscribed from among those present, the meeting adjourned to report at the end of three months, but enthusiasm in the subject apparently waning, the contemplated November meeting was not called. Disagreement among its friends as to the best form the monument should take was believed to be the reason the project failed to materialize.

I come now to the important event early in the reign of Kamehameha IVth., viz., his marriage to Emma, daughter of Dr. T. C. Byde Rooke, and granddaughter of John Young, friend and counselor of Kamehameha Ist, which event took place at Kawaiahao church on a perfect day in June, the 19th, 1856. The skies were bright with trade-wind fleecy clouds; the populace was bright with joy and anticipation of the auspicious event; the town and shipping was bright with flags and streamers befitting the occasion, all of which betokened a veritable gala day.

King street from the palace to the church was carpeted with rushes and a marsh grass, and was flanked on each side of the roadway by the military and throngs of spectators. The church itself was decorated and festooned with floral and maile wreaths to an unusual degree, for the occasion was Hawaii's first public royal wedding—and it has proved the last. A platform was erected in front of the pulpit, on which the ceremony was performed in full view of the whole audience. Rev. R. Armstrong officiated, using the Episcopal service, in both English and Hawaiian. The bridesmaids were Princess Victoria Kamāmalu, Princess Lydia Namakaeha (late ex-Queen Liliuokalani), and Miss Mary Pitman. His Majesty was attended by his brother Prince Lot Kamehameha.

As the wedding party were driven back to the palace through the avenue of loyal subjects, at the close of the ceremony, salutes were fired from the forts and a French vessel-of-war in port. Diplomatic felicitations followed shortly after, and in the evening a grand ball was given in the palace, for which occasion the building and grounds were brilliant with transparencies and illuminations, carried out by Marshal W. C. Parke and Paul Emmert, a Swiss artist. Several residences and hotels of the town were decorated in like manner for the evening.

A few months later the king contributed to the native paper, *Hae Hawaii*, an account of a trading experience he had

with natives in a recent visit to Molokai, which has a lesson for present-day agricultural effort. In substance the account was as follows:

"On arrival at Kalaupapa a vessel was met that had come to secure a cargo of potatoes, so I thought to enter the market, too, and the price being satisfactory, 75 cents to \$1.00 per barrel, it was arranged that the potatoes should be delivered the next day.

In the morning one of the traders came and said: 'We have consulted together respecting our potato trade, and we propose to give you as many as you wish.'* This I refused, having two vessels at anchor there, and said: 'I have money and you have potatoes, now let me have your product and you take the money.' They replied: 'The potatoes are for you, but the man who shall bring us the money for them, both he and the money will we throw into the sea.' I therefore reluctantly accepted their generosity. I was pleased to find them possessing the means for exercising their liberality according to their desire, and laboring diligently, with the sweat of the brow, according to command. It gladdened me to see the fruit of their labor. Having acquired the means they could trade, and because of their abundance they could give."

(Signed) KAMEHAMEHA.

On November 13th the Chinese merchants of Honolulu and Lahaina united in giving a grand ball to their majesties in honor of their recent marriage that proved not only a great success but the most lavish affair of the kind Honolulu had ever known. The ball was given in the court house, and was said to have cost the Chinese \$3,700. Everything passed off with great decorum, and even the novelties and success of the supper was long the talk of the town.

A prominent decorative object of utility was a large octagonal-shaped lantern, very Oriental in its ornamentations, the

* This was in observance of ancient Hawaiian custom.

panels of which were of white transparent rice paper arranged, evidently, in double or recessed form, between the space of which, miniature birds, fish, and other objects floated about, or rose and fell, as they were affected by the heated air from its many candles when lighted. It was far beyond my boyhood comprehension then, and recollections from time to time since still invoke wonderment at its ingenuity.

A few subjects belonging to the events of 1855 may be mentioned here before closing this period.

During that summer there appeared in the bookstore of H. M. Whitney a new work on Hawaii, entitled: "Sandwich Island Notes, by a Haole", published by Harper & Brothers, New York, which created something of a stir, especially after a caustic review thereof in the *Polynesian* gave it publicity. The book was apparently written in the interest of the late annexationists, but with facts and figures so warped, and the courtesies extended the writer in his tour of the islands so betrayed, as to utterly fail in its purpose of winning favor. The review, in two parts, which appeared in the *Polynesian* of August 11th and September 1st, handled the author and his production without gloves and in several places furnished rich reading. The reviewer at the outset scored the community at its supineness, remaining apparently indifferent alike to blame or praise, questioning "whether it is want of proper pride that numbs us, or a contempt of public opinion that steels us "to accepting such without protest". How many of these same experiences this island-community has suffered at the hands (or pens) of like transient free-lancers. At its close "Haole" is revealed as alias Mr. Wm. Baker, alias Mr. Washington Bates. It was under this latter name he traveled through the islands.

That Honolulu believed in the time-worn adage:

"A little nonsense now and then
Is relished by the best of men"

was well exemplified in the visit of the famous Backus Minstrels, in September, from San Francisco, en route for the

Colonies. They gave several entertainments in the Royal Hawaiian Theatre during their week's stay to crowded houses, and on two occasions they held forth by request at the palace to enliven evening hours. The editor of the court journal admitted having attended and enjoyed every performance, and commenting thereon said: "The little town has been quite excited, commerce had left its books and came near forgetting the proprieties in going to see the minstrels."

Backus and his company made a pop visit here on their way back, the following year, and refreshed mutually pleasant memories; the town for its enjoyment, and the visitors for a financial success that led to "tall" statements by Backus on reaching the home land which appeared in a prominent journal in the middle west reflecting on the missionaries that met with a response and vigorous denial from *The Friend*, beside a little preaching on "telling untruths to the million being as heinous as telling an untruth to Mr. John Smith".

During the following shipping season Honoluluans were entertained by two full-fledged circus companies, the National of Lee and Marshall, and Long and Raphael's Great Western, besides theatrical performances at the Royal Hawaiian, and occasional concerts at the court house.

Among the new enterprises dating from this period is that of soap making, which was inaugurated at Leleo, by Messrs. Packer, Abbott and Fetter. Changes in ownership, in time, brought the concern into the control of Fetter and Rawlins, and in due time a rival factory as a next-door neighbor, conducted by Geo. Huddy, both of which concerns contributed largely to satisfy local needs for many years in the common grades.

During this period of 1854-56 several changes in business circles occurred, more particularly in concerns identified with shipping interests. The whaling business may be said to have been at its height at this time, and the transhipment of oil and bone (the catch of vessels refitting for further cruising), to eastern ports via Cape Horn, brought to the ports of Honolulu

and Lahaina in the fall and spring seasons quite a fleet of the noted clippers of those days for this service. Local interest in the Arctic whaling industry took more definite shape, with the encouragement of 1854's successful season to warrant further ventures, so that by 1856 the Honolulu owned fleet of whalers and traders comprised two ships, three barks, six brigs and three schooners, representing the enterprise of Allen & Co., R. Coady & Co., Capt. J. M. Green, Hoffschlaeger & Stappenhorst, Jas. Makee & Co., Melchers & Co., C. A. Williams & Co., and a little later several others. A full account of the rise and fall of the local interest in this industry was given in the ANNUAL for 1913, entitled "Honolulu's Share in the Pacific Whaling Industry of By-gone Days."

This series of reminiscences of Honolulu sixty or more years ago would be incomplete without a sketch of the men of the times, a number of whom have been mentioned in passing. It will be my purpose, if spared, to recall for the Forty-fifth issue of the ANNUAL, brief memories of those worthies, the benefit of whose labors Honolulans of today enjoy.

HONOLULU HALE, Honolulu's first executive building, at the formation of a constitutional government, in 1843, is a thing of the past. This old landmark of Merchant street, adjoining the Post Office, having outlived its usefulness, was sold last summer at auction by the government for the munificent sum of ten dollars, to be removed at buyer's expense. Many express regret at the necessity of the loss of this historic connecting link with the past, but its long-dilapidated condition rendered it an eye-sore and a block to improvement in the very heart of the city.

The history of this building and its various tenants would furnish an interesting chapter of reminiscences.

SOME PLANTATION MEMORIES.

BY J. M. LYDGATE.

MY FIRST boyish acquaintance with the sugar business began, I should say, in the fall of 1864. We had landed in Honolulu, our family and that of Alex. Young, from Vancouver Island, in April, 1864, and after a short stay in Honolulu moved to Hilo, where the firm of Lydgate and Young inaugurated a small ironworks to minister to the needs of the sugar plantations along the Hilo coast.

Immediately back of Hilo, on the Puueo side, was the Amaulu Plantation owned by Chinese. The mill was about half a mile from town, and naturally an inquiring boy was not long in finding it and in developing a good deal of interest in it.

It was, of course, a very primitive affair. The crusher was water driven, by means of a large overshot water-wheel, I should say about 20 feet in diameter, which rattled and groaned and splashed mightily, like some weary Hercules. The rollers were iron ones, about fifteen inches in diameter, by perhaps two and a half feet long. The cane was fed into the mill by hand, from the pile in the yard, over an apron; a very circumspect feed carefully delivered, lest the mill be choked and some accident happen. There was no fly-wheel to act as a reservoir of power, though the water-wheel itself served that purpose in a measure, and of course there was no provision for reversing, a very necessary expedient in such a mill.

From the mill a scanty stream of juice ran in an open spout to the boiling house, which stood by itself some little distance away. Here was installed the open train, a series of four or five pots, five or six feet in diameter, diminishing in size somewhat to the final one of the series. These pots were shaped somewhat like an opili shell, or like the Chinese rice pots comparatively shallow and wide flaring, and were coupled, lip to lip, by bolts through an intervening flange, the whole

forming a range, set in brick walls, within which, and under the pots, a fierce fire was kept going. For this purpose the bagasse was insufficient and had to be reinforced by wood, and the liveliest job on the plantation was that of stoker, a poor unfortunate who was always being pai-pai-d or stirred up, in language as forcible as it was sometimes profane. The fierce fire kept these pots in a state of violent ebullition, while a Hawaiian attendant, nearly nude and sweating like a Turk, stood by with a long sweep to sweep off the scum from the top of the foaming juice. The vision through the open doorway into the dim interior with the dusky naked figures silhouetted against the great volumes of steam that rolled up into the dark recesses of the open rafters, and hung there to trickle back in large drops of sugar sweetened rain, would have been worthy the brush of a modern Rembrandt.

Meanwhile, as the density was somewhat increased by the rapid evaporation, the liquid was baled over into the next pot, where further cleaning and further evaporation went on, until finally, in the last pot it was boiled to "proof", the density necessary for graining. This point in the process was determined by the Chinese sugar boiler, who, with a long thin stick dipped into the pot, took out a proof, and trailed off a slender little stream into a large opihi shell full of water. And then taking the sample between thumb and finger, and holding up to the light he judged of its fitness for "strike". When that point was reached, the mass in this last pot was bailed out into a spout, that by the necessary connections, conveyed it away to the coolers, where it was allowed to remain for weeks, or until it had grained up from the bottom, leaving, however, a lake of molasses over the shallows of grained sugar below. In this lake many roaches, and an occasional mouse or even a rat came to an untimely end.

In due time the grained mass was dug out with spades, and shoveled into tubs, and slid along on skids to the centrifugals. The centrifugal, at least as a sugar-drying device, was a Hawaiian invention, the work of D. M. Weston of the Hono-

lulu Iron Works, of a few years before, and had, I fancy, been pretty generally adopted by the few mills on the islands. Those at Amaulu were very primitive affairs, small brass-screened tubs built onto the end of the upright shaft of a turbine water-wheel, operating in a pit under the floor. They probably wouldn't dry more than twenty-five pounds at a charge and as there were only two of them at Amaulu, the daily output was not very large.

The sugar resulting was packed in kegs, well-made containers, somewhat smaller than the present iron barrels used for cement. These came to the plantation in the knock-down condition of shooks and heads and were set up on the place. This involved a cooper for every mill, generally a white man, who counted as an important factor of the enterprise, along with the engineer and the sugar-boiler. Into these kegs was put, as I remember it, some 125 lbs. of sugar, packed with a heavy ohia pounder, then headed up and stenciled with the plantation mark, grade and weight.

For every purpose, except perhaps refining, this keg package was very much superior to our modern bag package. It was cleaner, more secure against waste and wet, against rats and pilfering hands, and against all the wear and tear of transportation. The one thing against the keg was its cost; that and perhaps its inconvenience in transportation. Of course those were the days when all our sugar went into the open market, and must be sold as grocery grades, and the looks of it went a long way; anything like mussiness, or any suggestion of floor sweepings was fatal.

The daily output was finally carted to the landing storehouse, whence, from time to time, it was shipped to Honolulu by schooner.

The transportation of the cane to the mill was a problem, even in those old days of small areas and limited crops. The bullock cart was the first, but for the Hilo district of much rain and hopeless roads, a most inadequate solution.

Attempts were made at rude tramways with ohia scantling rails, on which rude cars were hauled by draught animals. And one interesting experiment was made with a wind-driven railway. The cars were fitted out with great sails, which were hoisted when the wind was fair.

After a short residence in Hilo we moved to Onomea, the old Onomea, and lived there for some time; and there I came to know of practical plantation life as a small boy may learn.

Onomea—owned in those days by S. L. Austin,—was one of the most advanced and best equipped plantations on the islands at that time. The crushing plant, water driven like all the rest, was somewhat larger and heavier than most of the others, and there was a short cane carrier. The water-wheel was more powerful and the supply of water more generous so that more and better work could be done. It stood detached on a little rocky knoll, at the foot of which was the boiling house. In addition to the usual open train, there was a steam driven Wetzel pan, a sort of revolving washing machine, which perpetually stirred the strike at the same time that it evaporated it. I believe it was never much of a success and was finally discarded in favor of the vacuum pan, which had not been introduced as yet, though it came into use very soon after, or it may have been about that time, the pioneer pan on the islands being that used by Kaupakuea,—now Pepeekeo—a neighboring plantation.

As has always been the case more or less, the boiling capacity was behind the crushing, so that there was always overtime in that department, and during the busy season there was a night shift, with a night sugar boiler to get away with the surplus juice that the mill had sent down during the day. When we were at Onomea J. S. Emerson, then a young man working his way through college, was night sugar boiler. He occupied a small single-roomed cottage at the rear of the Austin Home, the most striking feature of which was a bed with a fierce red blanket cover. Some good friends of mine

recommended me to his kindly interest, and prevailed on him to tutor me in the rudiments of Latin, which I had just begun. By some means which I do not now understand, he invested declensions and conjugations with a charm that they never had before, or for that matter never since. By way of reward for a well-finished task he would give me a graphic and original presentation of some old classic story, which filled my heart with joy, and awakened great enthusiasm and admiration for my teacher. It was a real misfortune for me when the season came to an end and Emerson moved away. Had he remained and continued my instruction, who knows, I might have made a classical scholar.

With the poor varieties of cane, the defective cultivation and the still more defective milling the output per acre was woefully small. From the moment the cane entered the mill until it emerged as sugar, it was one continuous line of leaks and losses, through defective crushing, leakage, invert sugar, and high sugar content of waste molasses, so that I fancy not more than 50% of the available sugar was realized. Undoubtedly fortunes were fed into the furnaces or run to sea in those good old days; and that those lost fortunes were moderate rather than colossal is due to the fact that after all the amount of material was comparatively small.

Two or three tons an acre was considered a very good crop. I remember when, some years later, Laupahoehoe harvested 1,200 tons from 200 acres it was considered a phenomenal crop, too phenomenal to be credible. Those Hilo places turned out a few hundred tons each, and we thought that the limit of all endeavor in the sugar business had been reached when we heard that Pioneer, at Lahaina, had reached the unprecedented figure of 1,000 tons.

When we went to Onomea the first experimental flumes for the transportation of cane were being installed, and I remember distinctly the unfinished flume ending in an open field short of the mill, and how we boys found great joy in flume riding therein, seated on a bunch of cane tops or a

section of fern stump, down the grades where the water ran white, and over the end into the little pond which the water had dug out for itself. Locally, at least, we must have been the originators and inventors of this sport which afterwards grew to considerable proportions.

The fluming idea was not original with the sugar business but was an adaptation from the lumbering regions of the northwest coast, where it had been used successfully for the transportation of logs and rough timber. As adapted to plantation use, the flume was a flaring box flume, twelve inches on the bottom and the same on the sides. It was a permanent stationary flume, to which the cane had to be carted or carried, thus leaving a very considerable balance of the problem still to be met. The portable V flume, laid on the ground, with simple driven stakes to support it, without nails or bolts, so that it could be picked up in lengths and moved up to the cutting face of the field, was the adaptation later on of my father at Laupahoehoe, an invaluable method which greatly enhanced the efficiency and reduced the cost of fluming.

This method of transportation for cane at once became the standard for the Hilo District, for which it was specially fitted by virtue of an abundant supply of water, and a pretty uniform slope of the fields toward the mill, which was built at the lowest available spot on the estate. From this point of view the earliest mills were wrongly located, on the basis of a central position rather than the lowest. The consequence was that the lower lands were left idle or were cultivated at greater expense.

The variety of cane most commonly cultivated was ko kea—white cane—a Hawaiian variety, a fine soft cane, which fell an easy prey to rats and borer, of rather low sugar content and of few sticks to the hill. The so-called Lahaina cane came in later. The Hawaiian red canes, much cultivated on Maui, were not grown I think in Hilo.

Much of the land, even in my boyhood days, had a worn-out aspect, at least in the fields much cultivated, and the stand-

of cane on them was very poor compared with the crops on those same lands today. Such a thing as fertilizer was unknown, and doubtless the lands were quickly depleted, especially in that region of large rainfall and heavy leaching.

Breaking in new land, in those primitive days, was the bugbear of the sugar business. To clear a few acres a year of guava, puhala, ainau fern, uluhi, etc., burn off the refuse, and then plow the virgin soil, in even the most superficial way was a great undertaking.

Those were the days of shipped labor. As the name would suggest this way of handling labor was taken over from nautical experience, many if not most of the plantation men of that day being graduates from the sea. To "ship" was to enter into a formal contract for a stipulated time, generally a term of years, to do any kind of plantation work, so many hours a day. The incentive to this indenture on the part of the laborer, was the advance, the prepayment of a considerable portion of his wages in advance, which of course must be worked out as part of his term. The ordinary laborer drew all the advance he could get, and promptly squandered it; then he had to work out a dead horse, which of course, he was more or less reluctant to do. He schemed every way he could to do as little work as possible, and to get as much credit as possible, which meant, naturally, that he became more and more hopelessly involved. When at length he had reached the end of his tether, in the way of credit, his next move was to run away to some new field, where he could ship again, get a new advance, and work the whole scheme over again. Or, as a less dangerous alternative, when his needs became very pressing, he would endeavor to secure a fresh advance by shipping over again where he was for a new term on top of the balance of the old; and he would do this with the utmost equanimity, as often as the master would consent, until he became so hopelessly involved that nothing but death could be expected to set him free.

As I say, he was reluctant to do any more work than he had to, and took advantage of every possible excuse or justification for laying off. He was always ready to malinger or plead illness, and the number of near relatives that could die conveniently, and need burial at his hands, was phenomenal.

Whenever he failed to put in an appearance, he was liable to arrest and prosecution on the charge of haalele hana—quitting work—and if convicted was fined and remanded back to work again. Naturally he was not in any condition, or any mood to pay his fine, so his master had to pay it for him, and charge it up to his account, to be worked out, along with the rest of his term. The lower courts were full of such cases in those days, and embryo lawyers grew fat on them.

In order to check this haalele hana evil, a law was finally passed which required the laborer to put in two days of time for every one he lost in that way, which, of course, was added to the term of the contract, which finally snowed him in more hopelessly than ever.

Needless to say, it was a bad system,—for both parties. It was bad for the laborer because it discouraged and disheartened him, and tended to develop prodigal and careless habits, and it was bad for the master because it tended to foster an inefficient and unreliable type of labor. The system expired automatically with annexation.

The quarters in which the labor was domiciled made up a small grass-house village, generally not far from the mill. These houses were often built by the people themselves, with bamboos mainly for framework, and dried cane leaves for covering, in the form of thatch. When new, at any rate, these houses were delightfully clean, cool, fragrant, and well ventilated. Naturally they were not very durable, and fell an easy prey to decay and to fire. We lived in such a house at Onomea, though with board floors and glazed windows. We found it very comfortable.

My recollection is that the laborers were fed by the plantation; at any rate the plantation guaranteed them *pai-ai*, pound-

ed taro, poi in the rough, at fixed reasonable prices. Probably this was necessary to a fair turn-out for work. D. Kamai, a capable Hawaiian of a good deal of energy and enterprise, had a contract with the plantation to supply *pai-ai* at one cent a pound. He raised the taro on the outskirts of the plantation, steamed it in great *imus* or ovens, and ground it into *pai-ai* by means of a horse-power mill, a primitive affair somewhat after the nature of a meat grinder, the whole taro going in at one end and a steady stream of pasty *pai-ai* coming out at the other. This was then bundled up skilfully in *ti* leaves, in oblong bundles of 50 lbs. each. Once a week these bundles were distributed, by pack train throughout the village, and doubtless charged up in their accounts. Salt salmon was dealt out as required from the plantation store, and also charged up. These articles constituted the regular bill of fare, as I remember it, but were eked out from time to time by hard tack as a luxury. Fresh beef was also a luxury.

I can hardly leave O'noe without a word of appreciative comment on the Austins and the Austin home there. A man of more than ordinary education and intelligence, for many years a judge of the circuit court, he was naturally in the fore front of the sugar business in those days in enterprise and initiative, and was always on the lookout for better things. He was besides a broad-minded man with generous instincts that prompted him to lend a hand in every matter of public interest or welfare.

The Austin home, presided over by his attractive and cultured wife, a missionary daughter, one of the choicest of the stock, was widely famed for generous hospitality, and was the Mecca of many a merry surprise party, many a happy weekender, and many a weary traveler making a horse-back tour of the island. Such homes and such hospitality gave a peculiar charm to the simple life of those bygone days that can never be forgotten by those who knew them.

KONA CONDITIONS.

BY ALBERT S. BAKER, M.A., M.D., B.D.

President of The Kona Improvement Club.

SINCE some who read this have never been to Kona, let me say that the Kona district of Hawaii is about sixty miles long, with five regular steamer landings, seven postoffices, and twelve public schools. At our "civil center", at the boundary between North and South Kona and at an elevation of sixteen hundred and fifty feet, is our largest school (eight rooms), a Buddhist temple with a school attached, an equally large independent Japanese school, an English-speaking Congregational church, a branch of the First Bank of Hilo, with safety deposit boxes in its vault, the postoffice of Kealakekua, a County Hospital, a lawyer's office, a few small stores, and a hall. Within a mile either way is a Hawaiian church, an Episcopal church, a Catholic church, the tax assessor's office, the Food Commissioner, and the South Kona Government physician.

Kona is beautiful for quiet ocean, gentle breezes, and diversified vegetation. About anything that grows anywhere else in Hawaii grows also in Kona. The whole aspect of the country is thus unique. We have one small sugar plantation, but the cane is scattered in patches over a dozen miles, being sent down on wires to the railway which hauls it to the mill above Kailua. We have a large acreage of coffee, but even this is so scattered that there is no monotony in vegetation. Forest and fruit tree, with open vistas extending many miles, give a most diversified landscape. We have no grand gulches or running streams, but Hualalai, our double-peaked Kona mountain, is beautiful, and the long slope of Mauna Loa is most impressive. Few of us live at the warm sea-level, but where we do live the climate is ideal. There is not so much difference in temperature between normal summers and win-

ters in the daytime, because summer is our rainy season and winter the dry. The summer days, which would otherwise be warm, are cloudy, and the winter days are full of sun. But nights are much cooler in the winter, though even in the summer, on the upper road, we never sleep without a blanket. Come to Kona in the summer if you cannot come at any other time, but do not forget that the ideal days are in the winter.

The historic interest of Kona is great, with most things accessible to the automobile or within easy walking distance. We are soon to have a new road from Napoopoo to the City of Refuge at Honaunau, which vies in interest with the relics of Capt. Cook about Kealakekua Bay. Kailua, our chief port, has the Third Circuit Court House, and its historic interest centers about Kamehameha the Great and the first landing of the missionaries. Keauhou concerns Kamehameha the Third, and Kahaluu the priesthood of Hewahewa.

Kona is well supplied with churches and chapels, both Protestant and Catholic, while there are also several Mormon churches, Buddhist temples, and Shinto shrines. Kona has seven Independent Japanese schools and one Korean school. H. Hackfeld & Co. are about to replace their present store in Kalakaua's old palace at Kailua with a modern concrete structure, and they also have a good store and lumber-yard at Napoopoo, our second important port. The Capt. Cook Coffee Co. have also recently put in a good modern store near the center on the upper road, with a first-class garage, ice-making plant, etc. There is a choice of roads down from above to most of our ports, and some of them are decidedly more choice than others. The South Kona roads are in much better condition than the North, though all will be good when we spend the \$50,000. available for each district when the bonds are sold. The Bishop Estate has built five and a fifth miles of road mauka from Keei, to open up new land, and are to build three miles of road for the same purpose at Keauhou.

Coffee forms the chief industry of Kona, with some 5,000 acres of trees; 4,600 of these acres are said to be cultivated

by Japanese, representing over a thousand families and over three thousand individuals. It may be of interest to know that an acre of coffee *has* yielded as high as 120 bags of cherry, or 24 hundred-pound bags of dry coffee. An extreme value of \$300. an acre *has* been paid for the best coffee land, or a lease price of \$30. a year, though this is considered too high. The crop this year is about the average. The best year produced between 45,000 and 50,000 bags.

Cattle stand next in Kona. There are some ten fair-sized ranches, the largest having nearly 5,000 cattle and the smallest some 300. The largest ranch is over twice as large as the next one, and the ten ranches total over 14,000 cattle. At one of these ranches a Japanese went to buy a horse. He asked a lot of questions, as we all used to do in the old days when we bought horses, and he kept it up until in exasperation his formant said, "What is the matter with you, to ask so many questions?" "I think more better ask plenty questions," was the reply, "or by-and-by when I get horse a bee will bite me." It takes a little time for us to see that he was trying to say that he was afraid he might "get stung!"

Sugar stands third among our industries, and the Kona Development Co. has made good along with all other sugar companies in recent years. It harvested 4,558 tons of sugar this year, from 1,553 acres, all but sixty-five of which were cultivated under contract. There will be 965 acres next year, all but 325 being cultivated under contract. This makes a total of 2,518 acres, or only half the number of acres devoted to coffee. This company is owned and managed by Japanese. One of Mr. Eben Low's steamers, which makes weekly trips to the Kona ports for freight, takes this sugar.

Kona oranges have as good a name as Kona coffee, and a pity it is that there are not more of them. A certain amount of tobacco is grown (eighty acres), and some koa lumber gotten out, but though various things have been tried nothing else is cultivated on a large scale. Of course a certain amount

of fruit, vegetables, pigs, and poultry are shipped to Honolulu, but no great business is done.

Our Kona Improvement Club has permanent road and school committees, and now a food committee, which has supplied seed at cost where it could not be obtained in the stores. The Club takes an interest in anything which makes for the betterment of the district in any line, from keeping cattle off the road (a perennial subject), to the management of the hospital and the eradicating of the fruit-fly. If you come to Kona when we have a meeting, visit us.

HIBISCUS DEVELOPMENT IN HAWAII.

BY GERRIT P. WILDER.

HAWAII may truly be regarded as the land of the Hibiscus flower, for nowhere else in the world can there be found such numbers and varieties of this beautiful flowering plant.

The Hibiscus is indigenous to these Islands, there being several distinct native species. These, together with a number of introduced species, formed the nucleus from which the marvelous variety of new creations have been developed.

Hibiscus arnottianus, or Kokio keokeo, is the native white species, of which there are several distinct varieties such as the *Hibiscus Waimeae* of Kauai and the Molokai pure white. Practically all of the native whites are fertile and when artificially pollinated cross readily with many other varieties. The reason, however, why there have occurred no natural hybrids between the native whites and native reds is because the blossoms of the white, although very fragrant and attractive to insects, open late in the day, and the pollen sacks burst too late to become crossed with the red species which blooms early in the day and its pollen has become dry.

The indigenous red hibiscus, Kokio ula, though more rare than is the native white, occurs on several of the Islands, and is an interesting flower. The *Hibiscus brackenridgei* is the

native yellow, with which, so far as I am aware, no crosses have ever been made. *Hibiscus Youngianus*, a species found in wet and swampy places, has a lavender-colored flower, but not of much importance.

The exact date of the introduction of hibiscus from foreign lands is not definite. The earliest mention of the flower occurs in a letter written in 1854 by one of our early missionaries to a relative in New Bedford. The writer speaks enthusiastically of a beautiful new red flower, then blooming in one of the Honolulu gardens; a flower from China and called the "Shoo Black flower". This was, as we know, the *Hibiscus Rosa Sinensis*, our common red hedge variety, which has been of such value in our gardens ever since. It does not seed, but is propagated from cuttings.

Since the introduction of the common red, there have been a number of new varieties brought from foreign lands, among them the *Hibiscus schizopetalus*, or Coral Hibiscus, which has been constantly used as the male parent in crosses. A white variety introduced from Fiji crosses readily. *Hibiscus sabdariffa*, known as Roselle, is cultivated not as an ornamental plant, but because of its calyx which is very thick and fleshy, and which makes a delicious conserve.

Hibiscus mutabilis is an interesting flower which looks in the morning like a great double white hibiscus, and in the afternoon turns to a rose pink. So far as is known, no crosses of this with the native species have been made.

Mr. Walter M. Giffard was the first in Hawaii to create new forms of the hibiscus by means of artificial cross fertilization, and a number of very beautiful flowers are the immediate result of his efforts. The more remote result of his work is the great impetus given in the direction of hibiscus culture; for a number of enthusiasts have followed his lead and with marked success.

Similar methods are employed in these crossings as are resorted to in the case of other flowers. The flower of the plant chosen as the female parent must be carefully guarded against

self or accidental pollination, and for this reason it should be emasculated by cutting away the petals while in bud. It is then covered with a bag until it has been artificially pollinated, after which it is kept covered until the stigmas can no longer take up any air-borne or insect-borne pollen.

The seeds ripen in from forty to fifty days. They are gathered, dried and planted, and will mature and flower in about seven to ten months. As naturally there occurs great diversity in both form and coloring, even in seedlings from the same pod, one should resort to grafting or budding in order to reproduce absolutely a particular variety. Grafting is not only the surest, but the quickest method. Select a sturdy plant, graft onto it and the flowers will bloom in five months.

One of the most valuable qualities that has been developed in the hybrid varieties is the lasting quality of the flowers. Whereas formerly the hibiscus flower was of little use for decorative purposes because it closed so early in the afternoon, latterly, by careful observation and selection, the lasting quality has been more and more developed until now we have flowers that are quite fresh after forty-eight hours.

The Hibiscus Society of Hawaii was formed in 1911, and in that same year the first Exhibition was held in the rooms of the Promotion Committee. Some 250 varieties of blossoms were shown. In 1912 there were 600 varieties exhibited at the Y. M. C. A. In 1914 a magnificent show of blossoms, scientifically arranged for competition, was held at the Armory, and was one of the great attractions of the Carnival week, for both residents and tourists alike, as was also the exhibit of 1917 at the Pan-Pacific pavilion, at which not less than 2,000 varieties were shown, to the surprise and delight of all visitants.

Enthusiasm in the cultivation of the hibiscus, and the creating of new forms, is thus shown to be ever increasing. The Outdoor Circle, which has done such valuable work in beautifying Honolulu, has chosen the hibiscus as its flower and

it is safe to state that it would be difficult to find a garden, large or small, in Honolulu, that has not its lovely hibiscus blooms.

CHILD WELFARE MOVEMENT.

HONOLULU'S BABY WEEK.

BY JAS. A. RATH.

AS "Baby Week" had been conducted successfully in many of the mainland cities, Honolulu was asked to organize a similar child welfare movement. Brief mention of its inauguration was given in last ANNUAL.

In the hope of arousing interest for such a step, during the week of March 24th, 1916, an educational campaign was carried on through the papers of the city, the foreign language papers doing their share as well as the English. Such splendid articles had been written thereon by several women that keen interest was shown by the public, and an early date for "Baby Week" in Honolulu was set—that of April 24th—thus giving the various committees a little over a month for preparation.

All the city became aroused—"Baby Week" was talked of on the streets, trolleys, and in the different local organizations, as effort had been made to have every organization help in some way.

Palama Settlement was chosen as the most suitable location for the enterprise, on account of its large gymnasium which could be used for the exhibits: the club rooms on the first floor which could be used for the examinations of the babies, and for its well-equipped dental and medical departments.

The daily programs were held from 1 till 5:30 p. m. and in the evenings from 7 till 9 p. m. In the afternoons, practical demonstrations on bathing, feeding and caring for the baby were conducted by graduate nurses, and lectures by some of the best local physicians on various subjects. Lectures were

given in Chinese and Japanese also, and interpreters for the other languages were present every day so that all the mothers could hear the lecture in their own mother tongue.

In the evenings, lectures and slides were given under the direction of the Anti-Tuberculosis Bureau. These lectures were very well attended, showing the interest of the mothers and the "little mothers" who came.

The average daily attendance of visitors during the week was over 700.

Promptly at one o'clock began the examination of the babies, which was one of the greatest and most interesting spectacles Honolulu has ever seen. From the time the first baby was brought in until the close of the afternoon, the examiners were kept busy—babies of all kinds and nationalities in their best clothes and brightest colors, the Japanese and Chinese being the most gorgeous in this respect.

Nearly 500 babies were brought in for examination, but only 388 had a complete score card. There were 203 boy and 185 girl babies. The nationalities represented were American, British, Portuguese, Russian, Chinese, Filipino, Irish, Spanish, Norwegian, Porto Rican, Swede, French, German, Korean, Negro and two pure Hawaiian babies, only 33 babies of mixed Hawaiian blood. There were 53 different blood mixtures in all. The average score was 90%. Two American babies gained the 100% record. The lowest score was 71%, held by a Japanese girl. The score cards used were those arranged by the American Medical Association.

The examinations were conducted by the able assistance of some of the best local physicians and dentists and graduate nurses of the city. Too much cannot be said in praise of this volunteer work during the entire strenuous week.

In the main gymnasium hall were exhibits giving instructions for the different phases of a baby's life. The booths were for — Eye, Ear, Nose and Throat; Play; Feeding and Cleanliness; Clothing; Milk Dairy; Teeth; Home-made Furniture; Tenements and Cottages; and Tuberculosis.

The Eye, Ear, Nose and Throat Booth was well equipped with drawings showing the results of the lack of care of each of these organs, and charts giving necessary and helpful advice. At one side was a child's bed well shielded from sun and artificial light showing how a baby's eyes must be protected while asleep.

In the Play Booth were many simple home-made playthings and very inexpensive toys; also a chart containing articles that are very injurious for small children such as scissors, pencils, knives, etc. The most attractive feature of this booth was a miniature Playground with well-planned apparatus.

The Booth for the Feeding and Cleanliness of the babies held the daily demonstrations of bathing and feeding the baby from birth till six years of age. In the booth were articles that are the best for use—an especial effort being made not to show any article that was in any way unsanitary or injurious, for fear that some foreign mother might misinterpret the object of having the article on exhibition. Different kinds of simple foods were in evidence also.

The Clothing Booth had layettes for a Japanese and Chinese baby as well as the clothes ordinarily used. Two completely equipped sleeping baskets were on exhibition, made of the simplest and most serviceable material, with a price list. These were later given as prizes to the mothers of the poorest districts whose babies made the highest score—one baby was Chinese, the other Portuguese. Garments from bonnets to well-shaped shoes were on display for all the ages up to six years.

The Dairy booth gave samples of milk daily to any visitor showing that well-fed and cleanly kept cows produce milk that, when cared for, will remain sweet for many days. The best and most sanitary utensils used for containing the milk were also shown, and charts and pictures showing sanitary and well-kept dairies, as compared with the opposite kind. Mothers were told how to take care of the milk that was left at their door each day to keep it in the best condition for the children.

The Dental booth contained a chart that particularly attracted the Orientals. It showed the growth and development of the teeth in the gums from birth thru the coming of the wisdom teeth, and very old age when the teeth fall out. Also charts of "Don'ts" and "Do's" were hung on the walls.

In the booth for the Home-made Furniture, which was made by a woman, were a fireless cooker, ice box, child's chair and table, bed, shelves, and a table with a towel rack. All of the articles were made from packing boxes. This booth attracted the male member of the family especially.

Plans of some very unsanitary tenements and well-made simple cottages were on exhibition in the Tenement and Cottage Booth. It showed the public how very unhealthy the tenements are, and also how impossible it seems to be for the tenants to receive any better conditions from the owner. Cottages are proving the most desirable for the poorer classes, and it is only because of extreme necessity that they live in the tenements.

The Tuberculosis Booth was in charge of the Anti-Tuberculosis Bureau of Honolulu, and contained many significant charts of the cause and prevention of the dread disease. Also two or three mechanical devises were shown proving how easily the disease is transmitted through ignorance of the members of the family, and what terrible disaster a common fly can bring. The booth also contained charts explaining the values of different foods; and gave a demonstration of how an unsanitary dark room can be easily converted to a very desirable living-room.

Miscellaneous Charts and large maps were placed in prominence to show the Vital Statistics of Honolulu for a year. These maps showed clearly that the death rate was highest in the tenement sections of the city. At a side table literature on "The Care of the Baby" was distributed, printed in the different languages that all might read the articles.

The local firms of the city did their part in having window displays of their specialties for the good of the baby.

Many also loaned much material for the use of the exhibits. Free transportation by the Rapid Transit Company was given to the mothers from different sections of the city on especial days.

“Baby Week” was held in Honolulu for the purpose of establishing a Permanent Welfare Station somewhere in the city, “where babies can be watched more carefully and scientifically and mothers be educated that the death rate of infants be lessened.” Such keen interest in the subject was aroused during the week that it has been possible to have such a station. It is held in one of the Palama Settlement buildings. A veranda of this cottage serves as a cool waiting-room for the mothers. Inside is the main office for the nurse in charge. Here is literature, containing instructions for the care of the mother and baby, which is distributed freely. On a table is a layette, and paraphernalia needed for a bottle or breast-fed baby. The other rooms of this station are—a rest room for the baby; an examination room and a small laboratory.

A physician comes in the afternoons daily to make the examinations or to give needed advice for any baby and mother who desire the same. The Welfare Nurse also visits the new-born babies in the districts and supervises the care of the mother before and after childbirth.

PALAMA SETTLEMENT

Started as Palama Chapel June 1, 1896; Incorporated July 21, 1910.

<i>President</i>	J. R. Galt
<i>Vice-President</i>	W. F. Dillingham
<i>Secretary</i>	G. P. Denison
<i>Trustees</i> —Richard Ivers, John Waterhouse, W. R. Castle, Dr.	
W. D. Baldwin, F. J. Lowrey, John A. Hughes, G. H. Angus, Geo. R. Carter, A. L. Castle, Geo. N. Wilcox, Dr. O. E. Wall.	
<i>Head Worker</i>	J. A. Rath

THE PASSING OF KAMEHAMEHA I.

BY W. D. WESTERVELT.

IN THE several Hawaiian papers of about fifty years ago, are accounts of the death of the great king Kamehameha I. The united story is well worthy of preservation. He was born at Kokoiki, Kohala, Hawaii, in the year 1736. He died at Ka-maka-honu, Kailua, May 8, 1819, and was therefore 83 years of age when death came.

"Fourteen years of fighting united his kingdom. Twenty-three years were passed in directing its affairs. Seven years he dwelt on Hawaii in the time known as *Kaniaukani* (the name given to his return to Hawaii). Then he died at Ka-makahonu, Kailua, Hawaii."

"As a youth he was skillful in all games. His body was well filled out and muscular, and he had very broad shoulders. His face was thick and his ears large. He was over six feet tall. He had a very strong will. He was not obstinate, but persuasive.

Kamakau, a native writer, thus sums up Kamehameha's character: "He had great self-control, and his inward feeling was not always shown in his face. He was a father for the fatherless, life for the old men and women, a help for the distressed, a farmer and a fisherman for the hungry, a kapa maker for the poor, and he did not collect taxes from the bodies of men, the animals, the houses, the clothing or the food. Up to the time of his death his body was not weak with old age, his eyes were not blind, or his head bent over; only by his white hair was he known as an old man."

He was ill a long time at Kailua. Kalanimoku and other chiefs left Oahu to go to him, leaving Boki in charge on Oahu. Some of these chiefs were sorcerer or medicine priests. Kalanimoku seems to have been one of the highest and most carefully taught of these priest-chiefs.

When they saw their king they knew that his illness was beyond their reach and that no medicine could heal him, so they agreed to tell him that he must look to his gods for life

or death. The high priest, probably Hewahewa, said to him: "Perhaps you had better build a house for your gods. You may live." The chiefs seconded the word of the priest and a heiau (temple) was either built or repaired.

Kukailimoku was the god for whom this heiau was prepared. He was Kamehameha's chief god and was consulted in all times of war or great trouble. He was made of wicker-work in the shape of a head, covered with the most costly and most beautiful golden and red feathers. It was said that sometimes when he was consulted the feathers would rustle and rise up, showing his anger against Kamehameha's enemies and his prophecy of victory over them. This god is now among the most highly prized objects in the Bishop Museum, Honolulu. The heiau for this god was made of cut or hewn ohia trees and in the evening a tabu was announced. Then the priest asked Kamehameha for a human sacrifice, saying, "A man for your god that you may live."

When the people saw this house of ohia wood built, they were greatly frightened, thinking that men would be caught and killed and laid on the altar. In their fear they fled through the evening shadows and concealed themselves in the rough a-a lava and in the forests. "By morning, only a few men were left with the chiefs."

They waited in their hiding places, for the sacrifice of some one to be finished and the tabu lifted. When the body should be placed on the altar they could safely return.

Kamehameha, however, did not permit any such sacrifice. He said to the chiefs and priests, according to one statement, "The man belongs to the chief," or according to another account, "The man is tabu for my chief," meaning that he forbade any human sacrifices and set apart the people for his son Liholiho. They were all "tabu" to any other person.

The priests prayed earnestly before Kukailimoku and watched for the least motion of his feathers, but there was no response. The signs from the god were studied in the clouds.

The signs which would show that it was willing to grant the prayers were these: The feathers would stand out like hair full of lightning, and tremble like a flag in the breeze. He also would leap from his sacred place and fall on a man, perhaps on shoulders or head, whatever place he wished. These were signs of favor and peace. If there were no signs, the sacrifice and worship were of no use; the heart of the god was without pity.

The king became more seriously ill and sent Liholiho to the temple, saying, "Go and pray to the god. I cannot. I am too weak." But the illness rapidly increased.

The chiefs heard that there was a powerful priest (kahuina mana) who could bring life to the sick. Pua and Kapo were his gods. The chiefs knew the power of that man and built two houses for the gods. Kamehameha knew the priests of these gods for they had healed him before. If he could not go to the houses then the gods were to be carried to his sleeping house. These gods were Kalaipahoa (or Pua, both names for one god) and Kapo. (Alae was another name for Kapo.) If the gods were taken, the sick one might get well. But the favor of these gods could not be secured. The illness increased. Three days passed while he was lying in that place seeking rest and healing, but he was no better; he grew weaker. Then the chiefs took him out of that place and returned him to his own rest house. That night they carried him to the hale mua for food. He took only a mouthful and a glass of water. The chief said, "You give us directions," but he did not reply and carried him back to his rest house and laid him down until about ten o'clock. Then they carried him again to the hale mua but he only took a mouthful of food and a mouthful of water. This was done frequently on account of the tabu forbidding men to eat in the sleeping house where the women were.

Then one of his brothers, Kaikioewa, said, "Here are all of us, your brethren, your chiefs and your foreigners. You must leave words for us, your chiefs, and your relations."

He said, "Why?"

Kaikioewa said, "I *hua na makou*," meaning "that there may be fruit or thought for us to preserve."

Then Kamehameha said, "Continue to move on in my right course—" He did not finish his sentence and his last words were lost.

Then John Young took him by the neck and bent over to kiss him and Hoapili took his ear and whispered that he would care for the body when death came.

Then they returned to the rest house. At midnight they carried him again to the eating house. His head was in the doorway and his body lay in the sleeping house. He began to breathe hard, so they carried him back and he lay in the rest house until two o'clock in the morning, when his spirit flew away from the body and the breath departed.

This was the night of Hoku according to the ancient method of reckoning. Leleiohoku, the child of a daughter of Kamehameha, was born in and named after this night.

When Kamehameha was dead, Kalanimoku called all the people outside. Two old men sat down inside and would not go. Kalanimoku urged them to go and one went out. The other remained. He had been a caretaker of Kamehameha in his youth. Kalanimoku saw that this was the great favorite of the king and let him remain.

Then the chiefs outside consulted about the right disposal of the dead body. One chief arose and said, "This is my thought. We must eat this body."

Then Kaahumanu said with a feeble voice, "The body perhaps does not belong to us but to the king (Liholiho). The breath which belonged to us has passed away. This body belongs to the chief himself."

Hoapili said to the chiefess, "You have no kuleana in this body because my chief, Liholiho, and I are the ones who have the care of this body. So it was commanded."

When the consultation was over, the dead body was carried to the temple for the priestly ceremonies. The ceremon-

nial pig was cooked and laid on the platform before the dead body (as an act of worship) to change Kamehameha into a god (an aumakua).

Then the priest said to the chiefs, "I tell you the law of human sacrifice (or self-offering) the *moepuu*. If a sacrifice of men is made in the temple one man can (moe iho) kill himself, but if the offering is made outside four men can be the moe-puu. If the body is taken near the *lua* ten men can die as the moe-puu, but if the body has come in the *lua* fifteen men can die. In the morning of that tabu night if men die there should be forty. Then the priestly ceremonies for the body of the dead king would be complete." Hewahewa was the high priest who announced this death ceremony.

After telling about the customs, Hewahewa turned to the young king and asked, "Where shall Liholiho stay? There are two places proper for him to retire to, Kau and Kohala, for it is not right for him to remain in Kona while it is ceremonially defiled by the dead body."

The chiefs decided that Kohala was the best place for the new king, a place full of his own people. The priest said, "This is the right place. He must not stay in Kona for it is defiled by this death."

Then the high priest took a pig in his hand and made it clean as a sacrifice for the heir of the kingdom to remove the defilement of the dead body and purify the heir so that he could leave that place, returning when the district was purified.

In the early morning, Liholiho went with his own men and some chiefs to Kohala. When he had sailed away, the chiefs and people acted like crazy people and wild beasts. Very evil was the way in which they showed their love for the dead.

The day was opening in the red light of the morning. The body was carried to the burial house. The people saw it and were wailing. One man crazed with sorrow came to the chiefs, leaped upon them and tried to leap upon the body,

expecting the chiefs to strike him dead. He flew upon the chiefs again and again and was driven away. He could not find anyone to kill him. Kalanimoku also tried to find moepuu, that "hill of the death sleep" and was pushed away by Hookio. The dead king's word was remembered and no one was slain.

The sorcerer-priests began their prayers about Kamehameha as if his death had been produced by sorcery. It was not in the thought of the people that he had died of sickness and old age. While these priests were making their place for prayer and marking it with kapa, a high chief, Keeaumoku, a brother of Kaahumanu, crazy with rum, tore down their kapas.

Then the priests charged the death of the king upon Kaahumanu and her family. The people treated them evilly.

When the days of purification were ended in the heiau places established for Kamehameha, when the platform for the body was covered with kapa and a girdle of leaves had been placed around the god, then the high priest finished his ceremonies within the temple house where he had been praying to the god that the spirit of the dead might be given life and welcomed to the company of the good spirits to dwell with Wakea, and not be sent to dwell with Milu, the king of the underworld. He was continually burdened with hope of getting life for the spirit. This prayer was called *lupa-lupa*.

If a spirit has no rightful place among the gods, then there is a prayer with daily sacrifice. There is also the prayer of quiet distress when the one praying waits quietly on the gods. There are many forms of prayer concerning the path to the gods. Different ideas prevailed about the method of changing a spirit into an aumakua. Sometimes it was permitted to go to its ancestors and sometimes to the beautiful land where spirits dwell.

When these ceremonies were finished, Hoapili prepared to obey the command given him by Kamehameha to take care of his body and thoroughly secrete it.

The children and grandchildren of Keaweaeheulu had the natural right to care for the body of Kamehameha because they controlled the burial places of Kiolakaa and Waiohinu at Kau. But Kamehameha distrusted them, because when his own father, Keoua, died, they took the bones to hide in the pali of Kaawaloa, and furthermore pointed out the place to other people. He thought they would not be true to his bones, therefore he gave them to Hoapili to hide and not reveal.

About midnight, when the people were sleeping and no one passing along the paths, and the lava field of Puuokaloa lay in sacred silence, Hoapili sent his man Hoolulu to get the tied-up bundle of the body of Kamehameha and take it to Kaloko, Kekaha. He got it, laid it on his back, carried a gun in his hand and went out on the a-a along the path of Puuokaloa. He saw a stone which he thought was a man and fired his gun at it. The sound was heard at Kailua and Honokohau, and the chiefs thought that the body of Kamehameha had been taken by some man.

Early in the morning, Hoapili and Keopuolani went on a boat to Kaloko and met the trusted servant who was watching the pit where the body was concealed.

"Only the stars of the heavens know Kamehameha."

It was said that the bodies of the high chiefs Kameiamoku and Kamanawa and the bodies of Kalola Pupuka (w), the child of Honokawailani and Kaliekili Nui Ahumanu, had been concealed in this same secret pit.

Sometimes the bones of a chief were dishonored, hence concealment was considered necessary.

Kamehameha had greatly desired Kaawaloa as a burial land. He asked Keaweheulu to sell it, but he refused.

David Malo says: "Hoolulu, a chief and confidential friend of Kamehameha, took the bones after the flesh was removed and burned, and secreted them in a Kona cave. Returning in the morning, he met two natives. 'Did you see anyone pass in the night?' They replied in the negative. The chief was ready to kill them if they had seen him.

Years later Kamehameha III. persuaded Hoolulu to show him the cave. They started, but a crowd followed them and Hoolulu refused to go on. Never afterward would he listen.

For ten days Liholiho remained in Kohala at Kawaihae. Then he was sent for, but Kekuokalani would not let him go to Kailua nor would he go with him. After two days Liholiho went to Kailua, where all the chiefs gathered together at *Kamakahonu*. There Kaahumanu invested the young king with his royal privileges as Kamehameha had commanded. "You are the mother. You are the prime minister (Kuhina-nui) for our child. If he does wrong you take the government and care for it."

Liholiho came to the temple wearing a red coat and yellow feather cloak and the royal hat given him by the Englishmen. Some chiefs were by his side and some following bearing kahilis and spittoon calabashes.

The people watched him with great fear, honor and delight.

When he met Kaahumanu, she said to him, "E kalani! O Divine One! I tell you the things commanded me by your father. Here are the men, here are the chiefs formerly your fathers. Now here are your (pua) flowers and here is your land. We will eat together in the land."

Liholiho assented to the words of Kaahumanu, was placed in charge of the government and bore the name Kamehameha II.

THE fish of the Hawaiian Island were first officially recorded as early as 1782 by Broussonet from specimens obtained during Captain Cook's third voyage to the islands. In 1903 the United States Fish Commission described 902 species of fish belonging to the region of the Hawaiian Islands, including a large number of the giant mackerels, such as the swordfish, tuna, oceanic bonito, and albacore. With such available and authentic records, it is surprising that Hawaii is only now coming into its own as one of the world's greatest game fish resorts.—*S. F. Argonaut*.

DEATH, LYING-IN-STATE AND OBSEQUIES OF QUEEN LILIUOKALANI

LAST SOVEREIGN OF HAWAII

L ILIUOKALANI, she who held Hawaii's scepter last, is no more; the link that connected the present with the monarchial days of the past is broken, and her people, with aliens from other lands, are in sorrow. The ex-queen after some months of gradual failing health, owing to her advanced years, passed away peacefully at her residence, Washington Place, Honolulu, Sunday, Nov. 11th, 1917, at 8:30 a. m., surrounded by remaining distant relatives, friends and faithful attendants, aged 79 years, two months and nine days; the last of her family and ending a long line of distinguished high chiefs from which she proudly claimed descent.*

Her long life had been filled with joys and sorrows; cares and responsibilities beyond the ordinary, and reaped the severer reward of her misguided judgment as ruler than any of her predecessors on the throne in the bloodless revolution of 1893, which overthrew the Hawaiian Monarchy. But she lived long enough to realize the error of her course and accept with grace the adjusting governmental changes consequent upon her overthrow which culminated in annexation to the United States. Though bitter with disappointment at the sudden ending of her reign, and hopes of restoration waned as months and years rolled by, the queen gradually forgave her political opponents, and in turn, by precept and example guided her people in loyalty to the Stars and Stripes and the government it represents.

It lost not a whit the devotion of her people. What she lacked from them as ruler, she received as alii by right of all

* Liliuokalani was born in Honolulu of the high Chiefess Keohokālole, daughter of Aikanaka, the son of Keohohiwa, the daughter of Keweheulu, the son of Heulu, the son of Kuanuuau (known also as Kapa-ihia-ahu), the son of Nuuanu (known also Ahua-a-I), the son of the powerful house of I, a high chief warrior and head of the chief clan of Hawaii called after him.

Hawaiian precedent, enhanced by sympathy, and won by her love and consideration. The unwritten law of the land held good in her case. Of old, deprivation of chiefly power was not accompanied by loss of rank, even though the chief became landless also. It might lie dormant during years of poverty and subserviency but could be asserted by right at any given chance. Liliuokalani therefore grew in the love and affection of her people as her years increased, and held the loyal devotion and respect of the foreign element of the community. Hence the widespread sorrow that pervaded the territory, made more pathetic by the fact of her being the last of Hawaii's monarchs, as also the last of her family line. Though the shortest in reign except Lunailo's, Liliuokalani enjoyed a longer life than any of her predecessors on the throne, since Kamehameha I.

Church bells tolled the sad news that the end (which had been expected daily for over a week) had come; life had slowly ebbed away; her spirit took its flight without perceptible struggle.

It devolved upon Col. C. P. Iaukea, her private secretary, and one of the trustees under her deed of trust, and who had been constant in attendance during the queen's illness, to see to the funeral arrangements. The governor (absent with the Congressional party at Hilo) on being notified of the event directed that the government assume charge of and accord the remains royal honors and a State funeral. Guards were set at once and thereafter partook outwardly the Military character, but within the precincts of death the ministrations of faithful life-long attendants, friends and loyal subjects, bore out the customs of the race in royal pomp and ceremony to the end.

While the body was being embalmed Kawaiahao church, the scene of nearly all State funerals, was made ready for the lying-in-state, and here the remains were moved from Washington Place at midnight of Monday, under military and police escort, accompanied by many attendants, bearers of stately

kahilis, relatives and loyal subjects, in solemn procession, silent save the wailing and chanting of one and another, en route, the streets meanwhile lined with people to witness the impressive Hawaiian custom of midnight honors. The casket placed upon its bier at the church was surrounded with a forest of large stand kahilis, within these beside the body, stood the watchers, four on each side, with small hand kahilis which they waved in rhythmic order; behind them stood the guard of honor. At the foot of the casket stood one as captain of the watch, motionless. These all changed watches every two hours.

Tuesday the body lay in state from 10 a. m. till 10 p. m. and was viewed by a vast procession of people eager to pay homage to the late queen and gaze for the last time upon her wan face; foreigners in mute and curious sympathy; the natives at intervals venting their sorrow in the oldtime olis, chants, or the uwe helu* lamentation, more particularly among the seated audience. For this occasion the body was without its casket and lay upon a pall of yellow plush, dressed in a shroud of ivory-hued brocaded silk, and wearing her jewels, decorations and diadem. At the head, to the right and left, were two puloulou, or tabu sticks, their spheres covered with white kapa, and at the foot stood the gilt ball puloulou of Kalakaua, with its pendant coat of arms jewels. Floral offerings which were many were arranged with taste and harmony, together with the ahuulas and feather leis.

* The following show the various expressive forms of grief with Hawaiians:

Uwe helu: wailing, in which the mourner recounts his or her experience with the dead, or the exploits of the lone one.

Oli or Olioli: is a continuous monotonous utterance of a chant.

Kanaenae: a method of chanting in which the chanter hesitates at regular intervals to recover breath. In this, there is a greater variation in the tone, the pitch being higher than the olioli.

Hoouwewe: in chanting, is to imitate wailing.

Paha: is simply to call the deceased in a chant.

Mele inoa: the recitation of the genealogy of the dead and his or her earthly associations.

Namu: in chanting, is a very rough-voiced expressing of one's thought.

This arrangement prevailed throughout the week, varied only in its setting by the daily change of floral tributes and bi-hourly change of the kahili-waving watch, and guards. Many pathetic incidents marked the day, as also in the days and nights following, among which was the low singing by the retiring group of watchers at each change of "Aloha oe", the now wide-world-known song of the late queen's composition, the closing lines of which held a new and deeper pathos as they sang, which touched all hearts and brought tears to many eyes:

"A fond embrace, a ho'i ae au,
Until we meet again."

At the appointed hour as the general public withdrew, the body was placed in a steel casket over which was laid a plush pall the corners of which bore the Kalakaua dynasty motto "Onipaa". Following this sad duty and readjustment of kahilis, and other decorations, the doors of the church were open night and day till 6 p. m. of Saturday, affording the public opportunity to pay their respects, and her devoted attendants and venerable subjects to participate in loyal devotional exercises according to their time-honored customs, in song, chant recitation, olis, or the weird, soul-piercing, disconsolate wail of a grief-sticken heart. During the week many distinguished visitors and officials testified to their respect, and the tributes laid at her bier marked their sympathetic aloha. To the hosts of strangers and new-comers the stately pomp of barbaric splendor with its attendant scenes were of impressive interest never to be forgotten. Never again, in all probability, will its pomp be equalled in the land. Of the various large stand kahilis—cylindrical feather plumes—that were grouped about the bier, organ loft, and central aisle of the church, thirty-one belonged to the queen and twelve or fourteen to Prince Kuhio. While black predominated, many of these were relieved at the top rim and conical base with yellow, red, or other color in contrast. Two of special historic interest in the queen's collection have served in royal funerals since prior to that of Ka-

mehameha III, and are known as "Kaolohaka" and "Keaka." Originally and for many years their handles, or standards, were formed of human bones, but in recent years these were discarded and buried, since which time ivory and tortoise-shell, in rings, have formed the handle of each. While these two were showing the effects of time, there were several seldom heretofore seen, and in colors, kinds of feathers, and sizes of kahili, made the scene particularly effective, as may be judged by the accompanying illustration. To this collection were added later several others from Princess Kawanananako.

Besides the procession of school children to pay their respects, special musical services were the marked feature on Friday that carried well into the night, the attractiveness of which drew a greater throng than could gain admittance. Signor Wanrell, Mrs. Chas. Hall, Julia Walanika and Miss Bernice Kahanamoku were the principal soloists, while quintettes and societies also gave Hawaiian selections.

Saturday, the final day of lying-in-state, seemed to be more particularly the Hawaiians' day, when they should feel less restraint from intrusion of the curios. Without design it worked out so. Early in the day natives came in for the last opportunity for homage and to voice their grief in their own way. Among them were new arrivals from the other islands whose sorrowful wail at times broke out with wild shriek and abandon.

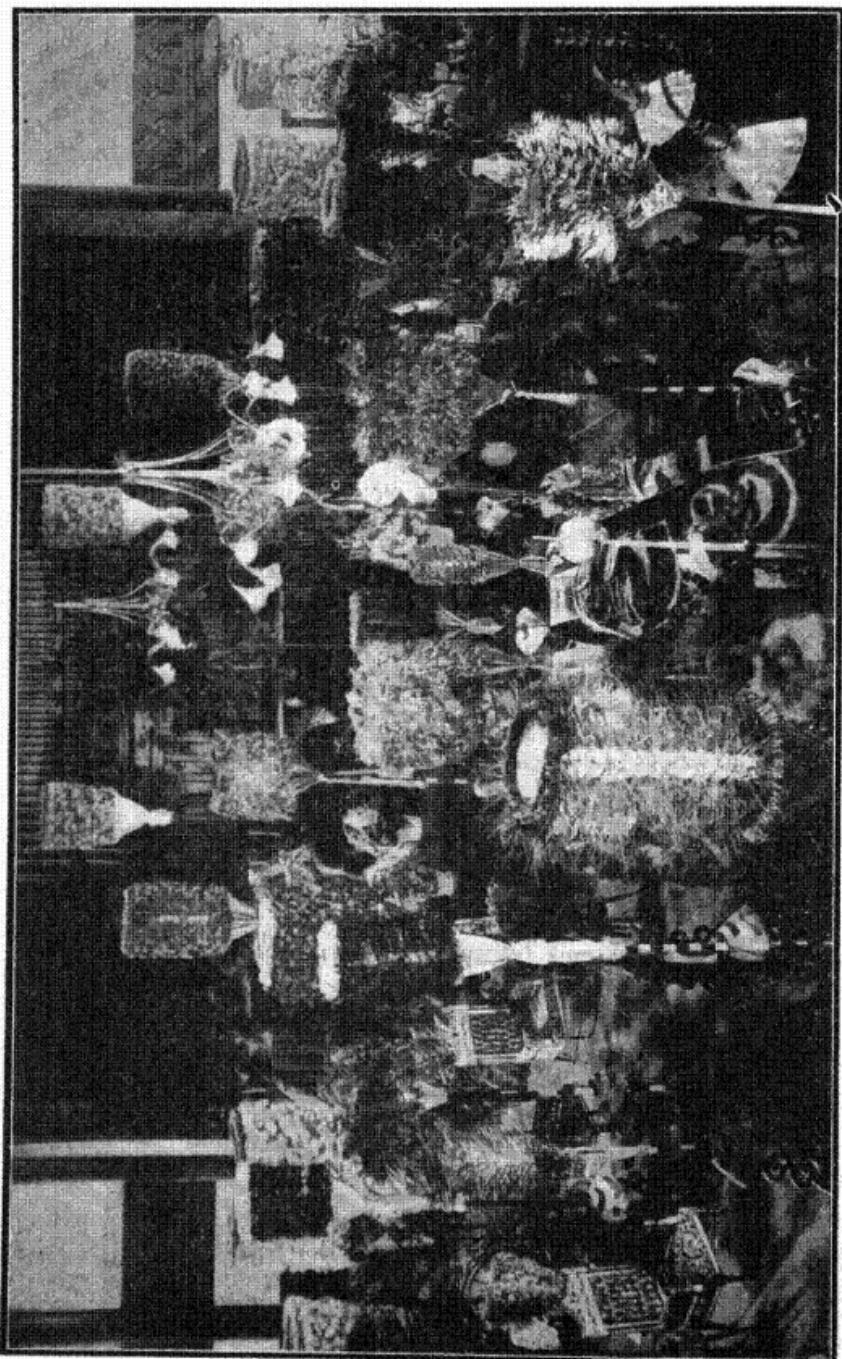
The Congressional party who had returned from Hawaii to participate in the obsequies, visited the church in a body to pay their respects, as did the Governor and other local officials also. Grief-singing in low voice, in solo or small groups, of short meles, as also olis and chants was more general than usual, and interspersed the spells of lone or general wailing so that the day was replete with pathetic and impressive incidents.

At six o'clock, with the change of watchers, was the preparation for removal to the former throne room of the palace. Kahili-bearers removed these ali'i emblems from their stands and took position ready for march: Rev. Leopold Kroll and the

Priory girls' choir of St. Andrew's cathedral then entered and rendered a short impressive Episcopal service, whereupon a body of chosen stalwarts lifted and bore the casket to the waiting auto-hearse flanked on either side with flaring kukui torches at the front steps of the building. At sight of the casket as it was borne down the steps fresh wailing and chanting prevailed. The church grounds and streets of the vicinity and line of procession was a mass of orderly humanity, through which the hearse, surrounded with kahilis and accompanied by officials and attendants, slowly moved forward to the Executive building.

This sad journey over and the casket borne to the throne room prepared for it, the people retired while close friends performed concluding services, placing the metal casket within one of Koa and Kou in keeping with royal caskets for ages past, and arrangement of kahilis, floral pieces, etc. Admission thereafter to building and grounds was restricted to official invitation, for the funeral services at ten a. m. of Sunday, November 17.

The city was astir early in preparation for the last sad rites; the military, various Hawaiian societies and lodges, schools, scouts, bands, poolas and other bodies assigned to places in the procession, as also the public in general in nervous expectancy. As early as nine o'clock invited ones to the Executive building had begun to fill the limited seats of the room and verandas. The throne room arrangement was as at the church with its silent, kahili-wavers and body-guards; the puloulou marking the sacred precincts, and flowers and wreaths, which came freely, including a floral tribute of sympathy from President Wilson, found place around the bier. Wailing, chanting and singing prevailed till at ten o'clock, when Right Rev. H. B. Restarick, Bishop of Honolulu, with Revs. Leopold Kroll and Canon Usborne of the Episcopal clergy, and H. H. Parker of Kawaiahao church, with the organist and surpliced choir from St. Andrew's cathedral entered the room for the funeral services.



L YING-IN-STATE OF LILIUOKALANI

This beautiful service was rendered impressively throughout, the intoning portion by Rev. L. Kroll resembling very much some of the Hawaiian olis. The musical selections of hymns and chants were comforting. At its close the audience filed out; the kahilis displaced and many borne out to places beside the catafalque at the front steps, bearers of royal orders and decorations followed and took their positions next in front of the car.

The casket was borne out and down the steps with difficulty owing to its weight, which taxed the strength of the dozen stalwart pall-bearers. The balance of the kahilis were brought out following the placement of the casket on the catafalque and assigned to places on each side; minute guns booming meanwhile. As the various military and other divisions or societies fell into place and the Poola society taughened on the ropes for the long pull, a company of singers on the upper veranda sang the sad song of farewell.

The route of the procession was down King street to Nuuanu, thence up to the mausoleum, all the way of which was lined with spectators, and cameras at every vantage point. As the cortege entered the grounds and the various societies took position, wail and chant broke out anew and continued, with singing, as the casket was preparing for the crypt. Surrounded by military, civil and naval authorities and other dignitaries, all possible honor was accorded Hawaii's last monarch; the new mingling with the old, in testimony of respect to her and sympathy for her people. At the close of the burial service, the casket was lowered to fill its destined niche in the Kalakaua dynasty crypt, and Liliuokalani was left alone to sleep with her kin.

OUR new work on "Ancient Hawaiian Mythology", mentioned in last ANNUAL as ready for publication, is, on the advice of leading publishers, deferred to a more propitious time in the book-market than in the midst of war.

HAWAIIAN VOLCANO OBSERVATIONS.

THE RESULTS OF SIX YEARS' WORK.

ADDRESS OF THE DIRECTOR T. A. JAGGAR, JR., BEFORE THE ASSOCIATION AT ITS ANNUAL MEETING, AUGUST 23, 1917.

From the Hawaiian Volcano Observatory Weekly Bulletin.

SCIENTIFIC DISCOVERIES.

The annual address of 1916 proposed a Kilauea volcano museum. Earlier addresses reviewed our beginnings and stimulated progress in making Mauna Loa accessible. The Observatory on July 1 completed six years of work if we include the preliminary observations in 1911 made by the Technology expedition of that year. It becomes my pleasant duty here to review very briefly the really wonderful advance in volcano knowledge that has resulted from measurements and experiments at Kilauea, an advance much assisted by the outbreaks of Mauna Loa in 1914-16 and the accessibility of Halemaumau during the past seven months.

In 1911 the volcanic heat and liquidity were supposed to increase downward indefinitely in the center of the pit. In 1917 by actual soundings, we know the lava lake to be less than 50 feet deep, occupying a saucer or channel in the cooler and stiffer lava of the lake bottom, of the islands, and of the benches.

In 1911 most geologists still thought that steam actuated volcanoes. In 1917 it is known that only 4% or less of the Kilauea lava-gas is steam and even this in part may be burnt hydrogen. Burning sulphur, hydrogen and carbon gases we now know are powerful heating and oxidizing agents in and about the liquid lava, making great natural blow-pipe flames and effervescing through the hot liquid as in a Bessemer converter.

In 1911 the lava islands were spoken of as "floating". In 1917 we know them after years of careful measurement and record to be uplifted hummocks from the bottom of the shallow

pools. The consolidation of this bottom lava raised into an island, proved in February, 1917, to be clinkery lava or aa, hitherto almost unknown in Halemaumau but common on Mauna Loa.

In 1911 the main well or shaft in the crater was believed to be under "Old Faithful" fountain near the center. In 1917 at least eight such shafts are known, kept open by the rising rush of gas bubbles escaping continuously from solution in the main stiff lava column below. This lava foam rises to the surface, explodes in contact with air and circulates rapidly in a labyrinth of passages of its own making. Thus are produced the spectaculær fountainings and streamings of the slaggy lava, so awe-inspiring to the traveler on the brink.

The maps, profiles and photographs, made at short intervals with transit and camera, give the history of measured changes of outline and relief.

In 1911, at great expense, one temperature of the liquid at the surface of the lava was obtained with an elaborate cable trolley system, after sacrifice of much costly apparatus. In 1917 thirty-four measurements of temperature were made from the flaming cones on the floor and all through the lake to its bottom. This work was all done by direct contact of special thermometers encased in steel pipes, and at an expense which was trivial in proportion to the results attained. These results showed that the puffing flames are hottest, the fountains and the bright lines of the lava lake less hot, the lava just below the surface still less hot, and the interior of the stiff bench lava filling the pit from side to side probably least hot of all.

In 1911 no proof existed of any law or order in the risings and fallings of Kilauea and Mauna Loa lavas. In 1917, after six years of careful measurement and record, definite proof exists of half-hourly, daily, monthly, semi-annual, and longer term tides and periods in the movements of the fluid. Furthermore, response of Kilauea to the heavings of Mauna Loa was indicated in 1914-16. A diagram showing the earth-

quake spasms and eruptions in Mauna Loa reveals five marked coincident movements of the two volcanoes in two years, and an immediate return of the lava column in great volume to the Kilauea pit after the Mauna Loa floods had ceased. This diagram records one hundred and twenty separate weekly surveys made with transit. Such charts and measurements were never made before, and these are barely a beginning. Already they have been successfully used for prediction.

SCIENTIFIC THEORIES.

In 1911 the causes of volcanic activity were conceived in as great variety as the individuals who imagined them. A volcano was a steam engine; a volcano was not a steam engine. The earth was hotter downward: the earth was not hotter all the way down. The earth was heated from without inward: the earth was cooling from without inward. The argument in each case was based, not on accumulated measurements and records, but on the validity of this or that observer. One said, "Flames and smoke are abundant at volcanoes"; his opponent replied; "Flames and smoke are unknown at volcanoes." Such arguments as "craters have steam, therefore craters are steam engines," or "lava runs like water, therefore lava on Mauna Loa cannot be connected with Kilauea," are based on false assumptions due to insufficient record of the nature, consistency, temperature and chemistry of a lava column.

In 1917 the steam engine argument falls when the lava is proved to contain little steam and the so-called visible steam proves to be warm air moistened with rain water. The argument against connection between the two volcanoes falls when we know a lava column to be a duplex substance nearly solid, full of gas, and heating itself and foaming when locally uncorked. An eruption of Mauna Loa so conceived is an opening of the vent of a pent-up furnace whose gases were previously but slightly escaping with quiet effervescence through a small orifice at Halemaumau. The effect of the unplugging immediately reacts at the smaller vent, as shown by our charts,

but not at all after the fashion of a watery liquid. In 1917 I do not believe a volcano to be a steam engine, but think of it as Nature's glass factory, actuated by burning gases.

No more need be said about causes and theories. The cause of volcanic activity is subject for a volume, not for a paragraph, but every theory of value in science is essentially a grouping of hard-earned facts. The cause of volcanic activity will only first be stated when at ten such stations as ours, in ten different regions of the globe, experimental records have been kept for years of the rise, heat, consistency, release, flow and cooling of lava. I have myself seen and studied eight different volcanic systems in eight different lands, but only as result of the six laboratory years at Kilauea have I begun to learn a little about fundamental causes.

EQUIPMENT AND OUTPUT.

The foregoing statement of actual discovery embodying the results of six years of progress is more formally set forth in published scientific papers. Such papers hitherto published are only a skimming of the richest surface cream which rises from the full record books now stored on the Observatory shelves. It has been my task to expend the very limited funds available for this work, so as to secure, during the first official five years of the Observatory which ended June 30, 1917, the largest possible accumulation of records, leaving the work of digesting them to the future. In view of this policy the showing made in actual experimental discovery, revealed by the contrast, not of theories, but of known facts between 1911 and 1917 gives high promise for the future.

The record books, maps, photographs, seismograms and geological collections at the Observatory, accumulated during the years, form to my thinking a vastly more valuable asset than any mere apparatus or buildings. Equipment in apparatus or buildings can always be improved or repaired with money. The equipment in records is wholly unique in preserving the sequence and dimensions of changing volcanic processes of two

great volcanoes during a highly significant period. Were these records lost, they could not be duplicated even if a nation's ransom were offered as the price.

As to output, listed figures showing weekly and special reports, scientific papers, bulletins, photographs, and lantern slides were exhibited in last year's annual report. There are thousands of negatives and notes and instrumental tracings. The real output, however, of the establishment for which the subscribers of the Hawaiian Volcano Research Association are responsible, is the net effect on scientific progress of all these activities, on the community, and on the scientific and traveling world, and the example set urging others who live in volcanic lands to establish volcano observatories and so develop the science for its humane and technical ends.

MOTIVES.

The establishment has made records for six years. The Research Association has interested one hundred and fifty local people. The exchange list has reached two hundred other institutions and individuals. The work and the archives are growing in service and value, other institutions have increased their coöperation and interest and have expressed great concern at the mere mention of possible discontinuance. Discontinuance is not possible without forfeit, therefore is unthinkable. I have outlined above the scientific results of our work, but in now taking up the method of its continuance, it is necessary to analyze clearly our motives.

These motives are record, research, exhibition, publication; prevention of disaster; scientific hospitality, publicity, and propagandism. Truly a motley array of impulses, including commerce and education, foreign missions and the three-ring circus, with movie men to photograph the performers. And all to be carried by a modest wooden building on the edge of an active volcano, equipped with apparatus much of which is borrowed.

It is highly desirable to sift these aims down to their fine essentials, or to scrape off the parasitic growths and learn what is at the core of our problem. Research, publication and exhibition are matters of aftermath. Hospitality to visiting men of science and publicity are luxuries, not essentials. Prevention of disaster cannot be routine work, it is rather a goal to be striven for. There remain but two dominant, compelling and all inclusive motives for the work of the Hawaiian Volcano Observatory, these I insisted on in my first address of 1913, and these I reiterate even more strongly after showing results. The fundamental motive for an observatory is recording, and then improved recording and then more recording of a different kind. And following upon this is the propaganda of recording, extended to distant lands.

The future observatory in its scientific work will build a summit camp on Mauna Loa and make it accessible for prolonged visits. It will increase the precision and the frequency of the mappings of Halemaumau. It will collect the gases and take soundings and temperatures in many parts of the lava column. It will perfect telephotographic methods, apply the spectroscope to volcanic flames, improve scientific methods of taking moving pictures of the lava, establish voluntary earthquake stations around Mauna Loa and determine for a protracted period the daily tides in the lava lakes.

These things are all matters of recording, and improved re-recording means new facts. The grouping of new facts, as I have shown above, is the whole of science. These records thus improving, will always be our supreme achievements won through privilege of our possession, in Halemaumau, of the most marvelous natural geonomical laboratory on the globe. It is for you who dwell in Hawaii to say whether, with your wealth and your brains, you will build and extend this work as your own creation or whether you will yield it up to others.

SCOPE.

Just a word in this place about expansion of the work to include studies of other geological processes. There is

much to be said for Hawaii as an ideal center for geophysical measurement in the field of erosion processes on the land and deep sea processes off shore. Nearly twenty years ago I presented to the Carnegie Institution a plan for a geophysical institute in Hawaii. Still earlier there was printed in the annual report of the Director of the United States Geological Survey an estimate which I drew up for a topographic and geologic survey of this territory.

But all of this, interesting as it may be, is not the work of the Hawaiian Volcano Research Association as expressed in its constitution. Our proper work, namely *permanency* of volcanic recording and *extension* of volcano recording, is nowhere near accomplished. The first means an endowment here. The second means propagandist work in California, South America, New Zealand and Java, the Philippines, Japan and Alaska. Both of these, permanency and propagation, are absolutely essential to the determination of a volcano science, a science which by itself is of vastly too large a scope for any one man or group of men, to say nothing of the money required.

I can best illustrate this point by referring to such a laboratory as the Mt. Wilson Solar Observatory of the Carnegie Institute at Pasadena. That establishment has perhaps twenty times the staff of our observatory, but it is devoted wholly to the study of the physics of the sun. I asked the Director, Dr. Hale, if he could send me a spectroscopist to study Kilauea flames, a subject certainly of interest to astronomy. His reply was that he could not afford to go outside of their proper field, namely the sun. The only distinguishing feature about Mt. Wilson for solar study is that the air is clear. In our case the distinguishing feature of the Island of Hawaii is that the two greatest and most active volcanoes on the globe are there and only there. Shall we then dissipate our energies and our money in that unique field after a start which has been concentrated and encouraging?

THE VOLCANO OBSERVATORY PROPAGANDA.

With substantial scientific discoveries started, and invaluable record books accumulating; with bulletins, reports and articles accredited to Hawaii going into the libraries of the world; with travelers and scientists asking for photographs and asking to visit our plant; with Japan extending its volcano work; in view of all this progress, how can the Research Association join "hands around the Pacific" to get new work started in such colonies as British New Zealand or in Java?

Remembering the terrific disasters by scalding, drowning, suffocation and earthquake which these lands have suffered, conjured up in the mere names Krakatoa and Tarawera; disasters which are bound to decrease in terror with increase in knowledge, as we learn methods of prediction, of safeguard and of rescue; there should be strong appeal to the imagination of all members of this Association in the vision of new observatories in new places.

Besides the humane motive there is the scientific query, what are these distant volcanoes doing at the same time, while Kilauea lava is rising and falling? If there are summer and winter risings at Kilauea, are there summer and winter risings in New Zealand? The answer, yes or no, is a new discovery in science, yet to be made.

What use is there in knowing, do you ask? Answer: in order to discover how to predict, to determine the thickness of the earth crust, to connect volcanoes and earthquakes, to find out why the New Zealand eruptions are different from ours, and ours in turn different. In short, to solve the volcano mystery which underlies all the dwelling places of men.

But more than all these things there is the certainty of the supreme satisfaction of realizing that right here in Hawaii, on these little islands favored by possessing sugar as commercial asset and volcanoes as scientific asset, we will have built the famous center of a new science, and will hold the reins of a new chariot of enlightenment wherewith to do our bit in carry-

ing wisdom to the remote and stricken peoples of earthquake lands.

At the moment the disaster cry is drowned by the sobbing of a war-saddened world. But the war shock has awakened our new world consciousness, and we remote from war may well give our utmost to make the rest of the world less terrible. Nature's ruthlessness has only lately stricken Salvador. The frightful disasters of Messina and San Francisco are recent memories, lives lost by scores of thousands, and property by the thousand million in money. The Whitney endowment which first sent me to Hawaii required investigations "conducted with a view to the protection of human life and property".

If the dignity of missions, to link the world in loving kindness, was worth the devotion of Ellis, Bishop, Bingham and Coan, then is the protection of life, through science, a worthy service for their successors. It is peculiarly appropriate that they should force the pagan fire goddess to give up her seerets in alleviation of distress.

THE OPPORTUNITY FOR HAWAII.

It has been asked why little Hawaii should do this? Why not some eastern endowment of millionaire origin? Answer: the eastern institutions will be only too anxious and ready to take this opportunity away from Hawaii and to build up their fame on what Hawaii rejects. The implication would be that Hawaii is not interested in her volcanoes, takes no pride in their possession, or in having started a unique scientific institution designed for the welfare of mankind, and is glad to be relieved of the financial burden of its maintenance.

Of some hot, stagnant and slipshod tropical colonies which I have visited this imputation might be true, but not of Hawaii. The volcanoes of Hawaii, which have deposited her sugar soils, are as much the property of this energetic people as the older hills which store the waters of irrigation, or the indentations of the shore line that harbor our ships. For an educated folk possessing these things, as well say, "Why

doesn't some eastern institution build our wharves and our ditches?" The issue is not ownership or responsibility. The question at stake is simply, "Will you face the responsibility of that ownership as the privilege of a wealthy and highly cultivated community, knowing that these volcanoes are famous and unique, and knowing that they may give Hawaii a world fame as a scientific center controlling subordinate stations all around the Pacific Ocean? Or will you shift the responsibility because there is little financial return?"

IS THE FUTURE OBSERVATORY TO BE HAWAIIAN?

The volcano laboratories at Kilauea have been made use of thanklessly as a convenience in the past by travelers from distant institutions. The *Hawaiian Volcano Observatory* has reached the parting of the ways. The question is squarely before Honolulu and the Territory whether you wish the present establishment to be Hawaiian and to continue to grow and deal solely with volcano research. There is no other question before this Association.

The three stated purposes of our society are to record volcanic activity, to attract scientific men and to promote volcano observatories. We have no other aims and the Observatory has no other aims. Therefore this Association is and necessarily must be opposed to giving precedence at the Observatory to any studies not volcanological. We should heartily welcome in this field an expert student of the moon with his telescope, for the lunar volcanoes teach us much concerning our own volcanoes. But we would surely not attempt to finance him. In the same spirit of hearty hospitality we would welcome a student of the deep sea bottom. But we could not afford to charter his ship. It must not be imagined that volcano research is geology. The idea of perpetual record at observatories is hardly mentioned in the geological text books. The work of our Observatory is variously physics, chemistry, surveying and meteorology unitedly concentrated on two volcanic vents. We have no aim except to study those vents and all their ram-

ifications. The ocean may affect them, the sun and moon may affect them, but we are not specializing on ocean, sun or moon. We are specializing on volcanoes and volcanoes only, and all work must be directed to that end.

The executive Board of our Association has earnestly supported the Director of the Observatory in determining that the work shall be continued and shall deal with volcano research. It remains for this honorable society and this community, through loyalty to the Islands and pride in their fame, to decide on what scale the work shall endure, and whether the Kilauea laboratory shall be permanently *Hawaiian*.

MUST WE COUNTENANCE THE HULA.

DURING the past summer the *Advertiser*, in dealing with an entertainment of varied Hawaiian attractions given in the city, took occasion to commend effort of like character embodying tableaux, olis, music and songs and innocent dances, in marked contrast to the disgusting obscene hula productions that are too often paraded before the public, and for some unaccountable reason is being introduced abroad as a society attraction. The present writer was quoted as commending the attempt to furnish such Hawaiian entertainments illustrative of ancient customs and recreations, and instanced the first effort on these very lines but a few years ago at the Young Hotel, an invitational affair by Mr. E. L. Parker, a visitor from Buffalo, as a recognition of social courtesies from Honolulu's "four hundred".

I was further quoted as 'grieved at the apparent growing acceptance of the questionable hula, notwithstanding the protests that have been made and laws on the statute books regarding them; a result, doubtless, of the attempt to have it considered a religious ceremonial performance of the early Hawaiians, hence, by inference, innocent, a view that meets with but ridicule from those best qualified to know—the Hawaiians themselves.'

With all moral questions there are always those who would obstruct the effort, and charge the would-be reformers with narrowness; interference with one's liberty, and other resentful epithets. Such was the experience attending the incident above referred to, and amid expressions of approval came a very mandatory order over the phone to "mind your own business". Evidently someone's toes had been trodden on, and a probable source of revenue, or side attraction to legitimate business, interfered with.

It comes within the province of the ANNUAL to disseminate reliable information pertaining to Hawaii, and anything that is defamatory and seeks to mislead the public, makes it our business to deery such attempts, and the effort to exploit the lascivious, disgusting hula as an innocent amusement of the Hawaiian people of olden time, demands our protest in unmistakable terms, more especially as claim is made that it was "an institution of divine, that is, religious origin," and that its halls (*halau*s) were ever provided with an "altar as the visible temporary abode of the deity," hence, forsooth, having the approval of the gods it should by right therefore have the approval of mortals. Those who use this pretext in the endeavor to overcome the scruples of the better element, and foist the shameless thing at public gatherings as an ancient "religious" ceremony and expect unsuspecting visitors and innocent youth of both sexes to look unblushingly upon it, studiously avoid the admission by the author of the above "divine" conception of the hula, that "in modern times it has wandered so far and fallen so low that foreign and critical esteem has come to associate it with the riotous and passionate ebullitions of Polynesian kings and the amorous posturings of their voluptuaries."

This in itself condemns it as an unfit exhibition for any respectable public or semi-public gathering or society function, yet under the plea of rendering an attraction for the tourist, to meet the desire of a certain class, the attempt is made to popularize it, and in doing so commercialize it in vaudeville

shows and low channels, as was done last year, renders it quite time to protest, not only against the various disgusting hulas, for decency sake, but the effort to palm them off as a religious affair.

That Laka was the patron deity of the hula devotees, and its master of ceremonies a kahuna (priest), rendered it no more a religious performance than that of the canoe-building priest, which, like all Hawaiian callings also had each their special deities and invocations. Any impression therefore of the hula having any approach to a religious observance is erroneous. There was a temple service called *hulahula*, which may inadvertently have been the ground for the claim of religious character given the hula, whether of ancient or modern rendition. If such was the case, its ritual has been grossly misinterpreted, as may be seen by the following descriptive account:

"Hulahula was the name of the services of the kapu loulu, which was an important religious ceremony on questions of war or other national moment, observed in large temples like Leahi, Mookini, Puukohola and others of similar character, and in which only the high chiefs participated. The ceremony was held only at night at a time when the people were in slumber; in the solitude of night. At that time the high priest and chiefs entered the temple where the services were to be held on occasions whereby the king might learn clearly the favorable, or ill omens of coming events.

"The observance of the ceremony was so solemn and sacred that death would be meted out to the person who casually passed by; roving or disturbing animals also would be slain.

"In the evening the king made his entry into the temple. At the proper time for the service the high priest performed his duties according to the rituals of his order. If the ordinances were duly observed without interruption of any noise, the high priest would then proclaim the ceremonies perfect, auguring victory for the king in the coming battle, or other question before him."

Anyone can see at once that this religious temple service has no connection whatever with the amusement hula performances in open air, or halau, designed by the performers, with their indelicate bodily contortions to appeal to the baser passions. It is hoped therefore that no further attempt will be made to overcome public scruples of morality by any such flimsy statement of its religious origin.

There are laws on the statute books planned to license and control hula performances, but for some reason or pretext with shameless effrontery they obtrude their presence in public, and have been made the center of attraction in Carnival and Ka-mehameha day pageants and on other occasions.

The exhibitions of the hula at the opening night of the last Carnival drew forth the following:

"Concerning the hula dancing that was exhibited in the Palace grounds I would say no more than that I would have expected to see it somewhere in New York or Paris at ten cents or five centimes a ticket, but I was sorry to see it in Hawaii. It was about as typically a Hawaiian dance as Magna Charta was a 'scrap of paper.' Why should Honolulu show the hula in a form that we roast when we see it while traveling on the mainland?" (Extract from *Bystander*, Sunday Advertiser, Feb. 25, 1917.)

Also the following excerpts from Kahuna Nui, in the same issue:

"Mister Edditter! Here's sum thing what me and planty more Hawaiian, and kamaaina haole kicking about, and thas that HULA they having at the king palace one nite. And I think so even Kalakaua and the Kaumehameha statchu get a shame on they face if they see that. It makes us Hawaiian mad and shame, but I tell you true, you haole is the fault for allowed that kine of hula jus becos it putting sum munny in you pocket. One days you tell becos the hula is bad, then nother days you get sum Hawaiian to dancing it. If hula is bad one days, then its bad for erry other days in the ears. Since the time I bin born and lived and died in Hawaii nei I

never see this kine of hula what make the Hawaiian blushes underneath of they olive-brown skin."

The next day appeared this protest, signed A Hawaiian:

"Editor Advertiser—I wish to second the remarks of 'Kahuna nui' in yesterday's Advertiser, in regard to the public hula exhibition given in the Capitol grounds last week as a sample of Hawaiian dancing.

"It was lewd, suggestive and disgraceful. There were no ones more disgusted with it than the Hawaiians present. They felt keenly that they were being defamed in the eyes of the visiting strangers. It is to be hoped that future Carnival managers will see to it that nothing of this kind is permitted to occur again."

Disapproval has been freely expressed, and protests from time to time appear in the daily press, as is shown, but with doubtful result. Shortly following the published account mentioned in the opening of this paper, the following note came to hand, which speaks for itself:

"It has been a great pleasure to note the recent hard knocks against the present-day hula. When occasion offered I have done my own little "bit" against the hula, insisting that no worse sort of promotion could be invented, as it panders to the worst element, not to the solid, well-behaved class that every country needs. My voice however does not go for much, the subject needed the strong voice of substantial citizens, who command respect, having great influence.

Gratefully yours,

"JOSEPH DUTTON."

In support of the foregoing comes an echo from abroad. Evidently there has been "a chiel among us, takin' notes," and he has printed them to our disgrace and shame, as follows, for which we are indebted to the *Star-Bulletin*:

"A vigorous campaign to stamp out the time-honored hula-hula national dance of Hawaii, which is accomplished without the dancer moving his or her feet, has been instituted by clergy-

men and the reform element, according to Rev. Ezra Crandall, of Worcester, Mass., who arrived in San Francisco recently, after a visit of several weeks in the island capital, says the San Francisco Bulletin.

"The 'disgusting hula' of the present day, according to Rev. Crandall, is a survival of an ancient pagan ceremony practised by the Hawaiians, but it has so degenerated that it has become a moral menace. Rev. Crandall stated that it is the opinion of those conducting the campaign that every self-respecting Hawaiian should take a stand against the terpsichorean indecency involved in the native dancee."

"The hula, as it is commonly danced and commonly known now," said Rev. Crandall, "should be the subject of vigorous condemnation, and I do feel that every Hawaiian should feel this reflection on the decency and propriety of his race."

"For the honor and the good name of the Hawaiian race, all men and women of Hawaiian blood are being urged to join in discountenancing these indecent exhibitions. The mere fact that some people, principally tourists, want to see them is no excuse for their existence. They are a shame to the islands."

MORE MAUI HEIAU SITES.

BY courtesy of Mr. J. F. G. Stokes of the Bishop Museum, the following additions are made to the paper on Maui's Heiaus and Heiau Sites in our last issue. These were gathered as a side issue on his visit to Maui in charge of the Museum Exhibit at the Maui County Fair, held at Wailuku, toward the close of 1916.]

On the land of Hononana, between Honokahau and Kahakuloa, is a heiau, name unknown, reported to be still in good condition.

Kaneaola heiau, at Kahakuloa; north and middle of the valley; once stood on knoll south of road, nothing of which now remains. Kuewa heiau, at Kahakuloa, back in the valley. Also another one named Pakao. Not seen. All Kahakuloa in-

formation by local natives, who also reported a sacrificial heiau at Waihee, known as Kalanihale.

Ulukua heiau, in ili of Paukaula, Waihee, nothing of which now remains. Said to have been for sacrifice and honlu ai; built by Kahekili.

Kapoho heiau, southeast of Koihale, on slope of hill; now destroyed. Site not found.

Kamahoe heiau, on land of same name east side of the valley, destroyed; stones said to have been taken for cattle pen. Some discrepancy exists regarding this temple, as Liliha Keliipio, living on the other side of valley, said that Kamahoe was further mauka; a platform heiau, destroyed; its site now in eane.

Puukuma heiau, on ili of same name in Waihee, on the Waiehu side of the ridge, about a mile from the sea; destroyed by the plantation. Built by Kalanikupule for the welfare of people and land. Kane and Lono principal gods, and there were many others. Site not visited.

Puuhonua* and heiau Poaiwa, on land of same name, on ridge between north and south Waiehu, two miles from sea, just below the ditch. Reported that stones had been removed. Not visited.

Heiau Moonuku, for sacrifice; between Makawao and Kula. Not seen.

Heiau Poohoolewa, nearly a mile from sea, at Honopou, on plateau; a sacrifice temple. Stones disturbed; not visited. E. J. Smyth, school teacher at Huelo, is authority for this and the following two: Punokaupu, half a mile from the sea, at Honokala (now occupied by vacant house where Smyth formerly lived); on plateau; a heiau for sacrifice; not visited, and one, name unknown, 200 feet north of Huelo school, makai of road; demolished by Maui Sugar Co.

Punokalepa, a platform heiau for sacrifice, once stood about 800 feet east of Huelo Protestant Church; on top of

* Puuhonua, place of refuge.

small knoll on western side of gulch overlooking old taro patches; now entirely gone.

Hinalekahi heiau, at Hanehoi, below old ditch on the east side of gulch, west of Kailua Protestant Church. Nearly all destroyed when the ditch broke. Part remaining shows single high terrace; a temple for sacrifice. Jonas Kaea, informant on these two.

Pakanaloa, on upper slopes of Keanae, not far from sea; a platform heiau; not seen.

Kaluanui, a small heiau, 41 x 42 ft., on land of same name, at Wailua nui, below a *koa ia* known as Ohia, one-third of a mile from sea; on side of taro patch; of two sections, enclosure and platform, the latter running into the hill and seeming to have continued up the slope. Said to have been for sacrifice, and that the drums are heard.

Makehau heiau, on flat land of same name, at Wailua nui, mauka of main lower road, and one hundred and fifty feet south of Makehau road. Disturbed; of platform character, 43 x 72 remaining with indications that it extended to greater width. Eight coconut trees on platform, said to have been planted by Kaniho, who took care of the temple, and was remembered as an old man by Kalo, the guide and informant.

Mokae, a platform heiau at Hana; not seen.

Pumaoio, a heiau for sacrifice, in Papaka uka, Keoneoio; reported all destroyed.

Paahua, a heiau in the ili of Kalihi, for rain and fish; an L-shaped walled enclosure, 94 x 75 ft. said to have been repaired by Laemoa (k) and Kamalii (w), both of whom died over ten years ago. Had the appearance of recent repairs.

Koula heiau at Kanahena, for houlu ai. Not seen.

Heiau said to be on top of Puu Olai hill; name unknown; not seen.

Kalani heiau, at Kaeo, a sacrifice temple; drums heard. Not seen.

Nanahu heiau, on point, north of landing at Makena. A pavement of pebbles and some coral, about twenty feet square

and level with ground. No other features. Said by several natives to be a "heiau for dead people". Probably only a sacred place without temple structure.

Wailuku heiau, in ili of Kawililipoa, Kamaole, mauka. Not seen.

Kolea heiau, in ili of Kawililipoa, for sacrifice. Not seen.

Heiau, name unknown, in same ili, on sea plain, 200 feet makai or west of lower road and same distance south of Mormon church. Destroyed, probably a kahua. (Guide for last told of previous two.)

Heiau reported on Puu hele, Waikapu. Not examined.

Hikii heiau, at Ukumehame; on knoll east side of stream about a mile from the sea and 200 feet elevation. Northwest and northeast walls changed and interior used for grave-yard. Two remaining walls would indicate a size of 55 feet square. named after chief Hikii. (Kaahui, informant, aet. 93.)

A reputed heiau, located on west side of the stream, opposite Hikii; also used as a grave-yard. Kaahui denies that it was a heiau.

Heiau Kaiwaloa, at Olowalu, on hill near power line; a large, walled heiau in fair condition. Many graves in its enclosure.

A heiau at Honokahua was reported; name unknown, of which no particulars could be gathered.

Certain Japanese papers of this city for some time past have been endeavoiring to create a spirit of dissatisfaction among plantation laborers with their wages, notwithstanding the liberal bonus system that was entered upon last year in addition to their monthly wage, whereby day laborers on a number of plantations have averaged from \$36.20 to \$39.50 per month, while contracting cultivators show earnings ranging from \$23.69 to \$52.96 per month, and these figures are already being exceeded by the higher rates ruling this year's sugar market. It is estimated that the bonus to be paid laborers for the 1917 sugar crop will reach \$7,000,000. Some people, with the I. W. W. spirit, want the earth.

THE ALGAE OF THE HAWAI'IAN ARCHIPELAGO

AN ANNOTATED LIST OF THE KNOWN ALGAE.

BY VAUGHAN MACCAUGHEY,

Professor of Botany, College of Hawai'i, Honolulu, Hawai'i.

THE following list will indicate the specific character of the seaweeds, fresh-water, and terrestrial algae of the Hawai'ian Islands. Insofar as has been possible to obtain records, the list comprises practically all known Hawai'ian algae, and is the only up-to-date list extant. As the field has never been intensively surveyed in its entirety, there is undoubtedly a vast number of forms still undescribed. This is particularly true of the phyto-plankton. The list included brief characterizations of the species and genera, with special reference to geographic distribution. Items of special interest, such as economic uses, are also noted, although it has been necessary to sharply restrict such data, for sake of compactness. The list is intended as a reconnaissance, and carries no implications of completeness.

The sequence followed is that of Engler and Prantl; the sequence of species is that of De Toni's "Sylloge Algarum". The determinations are principally those of Tilden, Lemmermann, Reed, and Setchell; in many cases material collected by the author has been compared with the original descriptions, and the representative stations or habitats have been confirmed, re-defined, or extended. The literature concerning the habitats and ecological relations of Hawai'ian algae is scanty, and the chief aim of the present paper has been that of summarizing available data, and indicating the need for more detailed and intensive investigations.

CLASS SCHIZOPHYCEAE, THE BLUE-GREEN ALGAE.

I. CHROOCOCCACEAE.

A large, cosmopolitan family of twenty genera, occupying a wide range of habitats, from hot springs to endophytic situations. Eight genera of the Hawai'ian flora.

1. Chroococcus.

A genus of over thirty species, either free-floating or forming layers in damp places; in fresh or salt water, or in the tissues of other plants. *C. turgidus* (Kuetz.) Naegeli; in shallow stagnant pools; collected on the slopes of Mauna Kea, Hawai'i. *C. macrococcus* (Kuetz.) Rabenh.; in shallow stagnant pools; collected on the slopes of Mauna Kea, Hawai'i.

2. Gloeocapsa.

A cosmopolitan genus of about sixty species, mostly occurring on wet rocks, damp soil, and in shallow water; plants spherical, either single or a number associated in families; cells capsulated. *G. polydermatica* Kuetz.; plant-mass gelatinous, dull green or dusky olive; on wet cliffs and rocks. *G. quarternata* (Brebisson) Kuetz.; forming a gray-green mucilaginous coating on wet cliffs; often near waterfalls. *G. magma* (Breb.) Kuetz.; forms a grumous crustaceous coppery-purple mass on wet stones, along mountain streams. *G. thermalis* Lemm.; forms a mucous, hyaline or dark-purple mass; in hot pools on the island of Hawai'i.

3. Chondrocystis.

A monotypic genus. *C. Schauinslandii* Lemm.; plant-mass cushion-shaped, widely expanded, up to 35 cm. high, cartilaginous, soft, fragile, encrusted with lime at the base; recorded only from the Laysan lagoon.

4. Gloeothecae.

A genus of about twenty species, mostly on wet stones and among moss, rarely free-swimming in the water; colonies imbedded in a common gelatinous tegument. *G. fuscolutea* Naegeli; soft gelatinous, blue-green masses, covering the surface of the water in rice fields and among taro patches.

5. Aphanothecae.

A cosmopolitan genus of about twenty species, inhabiting fresh water and moist places; plant-mass more or less expanded, somewhat spherical or without definite shape. *A. Naegeli* Wartmann; plant-mass gelatinous, forming soft, olive-brown lumps on the sides of waterfalls, among mosses, liverworts, etc.; and on wet cliffs. *A. prasinæ* A. Braun; plant-mass soft, gelatinous, more or less globular, bright emerald green; forming free-swimming, tuberculous, globose, or flattened masses; floating in brackish stagnant water in rice patches and similar situations.

6. Gomphosphaeria.

A cosmopolitan genus of three or more species; the colonies spherical, mucous, solid, and free-swimming. *G. aponina* Kuetz.; collected among marine algae at Laysan.

7. Coleosphaeriopsis.

A monotypic genus; colonies spherical, gelatinous, hollow. *C. halophila* Lemm.; collected in the Laysan lagoon.

8. Merismopodium.

A cosmopolitan genus of about fifteen species, in fresh and salt waters; colonies flat, rectangular, free-floating. *M. glaucum* (Ehrenb.) Naeg.; in shallow, sluggish water, taro patches, etc.

II. CHAMAESIPHONACEAE.

A family of nine genera, widely scattered in fresh and salt water; mostly epiphytic or attached to shells. Two genera in the Hawaiian flora.

1. *Xenococcus*.

A genus of three or more species; marine epiphytes and on rocks and shells. *X. Laysanensis* Lemm.; epiphytic, disk-shaped colonies; collected on marine algae at Laysan. *X. Kernerii* Hansgirg; colonies irregularly expanded, crustaceous; fairly abundant in ditches and taro patches.

2. *Chamaesiphon*.

A genus of 12-14 species, epiphytic or on sticks and stones, chiefly in fresh water, rarely in the ocean; cosmopolitan. *C. curvatus* Nordstedt; collected among filaments of *Cladophora longiarticulata* var. *Elongatum* Nordst. was collected in the same places.

III. OSCILLATORIACEAE.

A cosmopolitan family of over twenty genera; filaments frequently branched, containing one or more trichomes. Ten genera in the Hawaiian flora.

1. *Oscillatoria*.

A large genus of over one hundred species, in fresh, hot, and salt water, and damp places; cosmopolitan. *O. sancta* Kuetz.; plant-mass dark lead color, "becoming violet when dried and tinting the paper a beautiful violet"; forms a reddish-brown or grayish skin on the wet sides of cliffs, ditches, and similar moist earthy places. *O. Bonne-maisonii* Crouan; trichomes form loose and regular spirals; epiphytic on marine algae, Laysan; mixt with other algae, floating in lagoons within the reefs, Hawai'i and other islands. *O. corallinae* Gomont; trichomes gregarious, forming a delicate coating on larger algae; collected at Laysan in washings from marine algae. *O. laetevirens* Crouan; plant-mass thin, membranaceous, bright blue-green; abundant, forming a delicate stratum covering the bottoms of tidal pools in rocky places along the platform reefs; also collected among washings from marine algae at Laysan. *O. formosa* Bory; plant-mass dark blue-green; common on wet cliffs in the mountains, as in the vicinity of waterfalls; also on the walls of moist caverns, near the mouths.

2. *Trichodesmium*.

A genus of five or more species, very abundant in warm and equatorial seas, near the coasts; the plants forming scale-like, disconnected, free-floating colonies, "sea bloom". The Red Sea is named from one of these plants. *T. Thierbautii* Gomont; colonies green; collected in plankton between Hawai'i and Laysan. *T. contortum* Wille; colonies bright yellow, spirally twisted; collected in plankton between Hawai'i and Laysan.

3. *Spirulina*.

A cosmopolitan genus of over fifteen species, in fresh, brackish, and salt water; trichomes unicellular, cylindric, sheathless, forming a regular spiral. *S. major* Kuetz.; plant-mass dark blue-green; usually scattered among other algae, on the sides of wet cliffs, and near the mouths of moist caves. *S. subtilissima* Kuetz.; plant-mass mucous, dark green; collected in washings from marine algae at Laysan.

4. Phormidium.

A large cosmopolitan genus of over fifty species, on wet rocks and in fresh water, rarely in salt water. Filaments simple, forming a woolly or felt-like layer, or rarely floating; attached at the base with free ends torn and ragged. Four Hawai'ian species. *P. Crosbyanum* Tilden; plant-mass 2 cm. thick by 5 cm. diam., impregnated with lime, somewhat hard, bluish-green to reddish-brown in color; forming flattened globose cushions on rocky shelves along the coral reefs and ledges, between tide marks. *P. papyraceum* (Agardh) Gomont; plant-mass expanded, glistening, thin, leathery, dark green; on wet rocks and cliffs, and around water-tanks, troughs, flumes, etc. *P. Laysanense* Lemm.; collected on Turbinaria at Laysan. *P. favosum* (Bory) Gomont; plant-mass moderately expanded, papery or thick, attached at base, floating; on sides and bottoms of irrigation ditches and troughs, tanks, etc.

5. Lyngbya.

A cosmopolitan genus of about sixty species, in fresh and salt water; filaments free, unbranched, free-floating or forming a densely intricate floccose or expanded mass. Thirteen Hawai'ian species. *L. mucicola* Lemm. epiphytic; collected on Chondrocystis Schauinslandii at Laysan. *L. rivulariarum* Gomont; occurring in masses of Nostoc, in ditches and taro patches. *L. subtilis* W. West; filaments solitary and scattered; in pools and ditches. *L. distincta* (Nordst.) Schmidle; in ditches and streams; also found among filaments of other algae, ex. Pithophora. *L. cladophorae* Tilden; epiphytic on filaments of Cladophora, in the mountain streams. *L. Meneghiniana* (Kuetz.) Gomont; plant-mass up to 1 cm. high, caespitose, fasciculate, mucous, dull blue-green; collected on marine algae at Laysan. *L. semiplena* (C. Ag.) J. Ag.; plant-mass rarely higher than 3 cm., caespitose extensive, mucous, usually dull yellowish-green or dark-green; growing in the rocky basins of tidal pools along platform reefs; also collected on marine algae at Laysan. *L. confervoides* C. Ag.; plant-mass 5 cm. high, caespitose, extended, fasciculate, mucous, dull yellowish or dark green; on rocky shores and in tidal pools. *L. aestuarii* (Mertens) Liebman; plant-mass widely expanded, either forming a compact woolly layer on moist earth, or a floccose mass floating in water, blackish or dull blue-green; common in ditches and muddy taro patches, forming a skin over the substratum, also on sandy beaches. forma *natans* Gomont; plant-mass at first attached to wet earth, later floating; filaments loosely entangled; floating in fresh-water lagoons, rice fields, taro patches, etc. forma *aeruginosa* (Ag.) Wolle; plant-mass dark blue-green; forming conspicuous patches in shallow water of rice fields and taro patches. *L. majuscula* (Dillwyn) Harvey; plant-mass up to 3 cm. in length, widely expanded, dark blue to yellowish green, filaments very long; epiphytic on other marine algae, in shallow water along the coral reefs. *L. Martensiana* Menegh.; plant-mass caespitose, blue-green; on twigs under dripping water; under flumes and tanks, and near waterfalls. *L. perelegans* Lemm.; epiphytic on marine algae collected at Laysan. *L. Kuetzingii* var. *distincta* (Nordst.) Lemm.; epiphytic on such forms as Pithophora and Cladophora, in ditches and ponds.

6. Hydrocoleus.

A cosmopolitan genus of fifteen or more species, in fresh and salt water; plant-mass forming a caespitose cushion. *H. cantharidiosmus*

(Mont.) Gomont; plant-mass up to 2 cm. high, caespitose, slippery, olive or dark blue-green; growing with other algae in shallow water along the coral reefs and beaches.

7. *Inactis.*

A cosmopolitan genus of 15 freshwater species. *I. Hawai'iensis* (Lemm.) De Toni; filaments solitary, growing in a gelatinous mass formed by other algae; collected in warm water in Hawai'i, in company with *Gloeocapsa*, *Stigonema*, etc.

8. *Microcoleus.*

A cosmopolitan genus of about twenty species, in the ocean and fresh water, rarely on moist soil; filaments simple or vaguely branched; creeping on the ground, sometimes growing among other algae. *M. paludosus* (Kuetz.) Gomont; filaments entangled, growing among other algae or forming a blackish or blue-green stratum; with other algae forming a layer covering rocks on the bottom and sides of the warm spring in Puna, Hawaii.

9. *Catagymnene.*

A genus of two or more species, widely distributed in warm oceans; filaments unicellular, floating free. *C. pelagica* Lemm.; collected in plankton between Hawai'i and Laysan. *C. spiralis* Lemm.; collected in plankton, between Hawai'i and Laysan.

10. *Haliarachne.*

A genus of several marine species; filaments multicellular, free-floating, in globose or elongate colonies. *H. lenticularis* Lemm.; collected in plankton between Hawai'i and Laysan.

IV. NOSTOCACEAE.

A cosmopolitan family, of twelve genera.

1. *Nostoc.*

A cosmopolitan genus of sixty or more species, in fresh-water or on moist soil, rarely in brackish water. Six Hawai'ian species. *N. punctiforme* (Kuetz.) Hariot; colonies small, globose, scattered or confluent; on the wet walls of ditches and taro patches. *N. paludosum* Kuetz.; plant-mass very minute, scarcely visible to the eye, punctiform, gelatinous; in ditches and pools. *N. Linckia* (Roth) Bornet; colonies of various sizes, finally clathrate-fenestrata and irregularly torn, blue-green or violet; with *Conferva sandwicensis* and other algae in pools, taro patches, swampy places, etc. *N. piscinale* Kuetz.; in rice fields and taro patches, ditches, etc. *N. spongiaeforme* Agardh; colonies at last expanded, verrucose, bullose; in taro patches and other shallow pools. *N. foliaceum* Mougeot; plant-mass gelatinous, spongy, lacunose; in globules among mosses and liverworts on wet cliffs in the mountains, and in the vicinity of waterfalls. *N. commune* Vaucher; plant-mass finally spreading out into undulating, folded, fleshy, torn or perforated sheets, leathery on the surface; common around water-troughs, tanks, flumes, and similar moist situations. *N. verrucosum* (L.) Vaucher; colonies often gregarious, up to 10 cm. in diam. at first solid, gelatinous, firm, spherical, later hollow and torn; forming small, black-green, shot-like balls, covering the sides of pools in falls and rapids of the mountain streams; not uncommon.

2. Nodularia.

A cosmopolitan genus of eight or more species, in fresh, brackish and salt water. *N. Hawaiensis* Tilden; plant-mass stringy, dark green; in tufts, along the outer margin of the coral reefs, constantly washed by the surf; fairly common.

3. Anabaena.

A cosmopolitan genus of about forty species, in both fresh and salt waters. *A. variabilis* Kuetz.; plant-mass gelatinous, spreading on damp soil or floating free, dark green; on bottoms and sides of irrigation ditches, taro patches, and other moist places. *A. catenula* (Kuetz.) Bornet & Flah.; plant-mass gelatinous, floating, blue-green; frequent in stagnant water of rice fields and taro patches; sometimes in mountain streams. *A. confervoides* Reinsch; plant-mass thin; floating in taro patches and other shallow water.

4. Cylindrospermum.

A cosmopolitan genus of about twelve species, in stagnant fresh water and moist ground; plant-mass expanded, indefinite, mucous. *C. stagnale* (Kuetz.) Born. & Flah.; plant-mass floccose, attached or floating; on wet cliffs and in the vicinity of waterfalls. *C. catenatum* Ralfs.; plant-mass mucous, orbicular-confluent, indefinite, blackish-green; along the mountain streamways, on rocks and wet cliffs; abundant in some places.

5. Richelia.

A small genus, endophytic; trichomes single. *R. intracellularis* J. Schm.; collected in plankton between Hawai'i and Laysan; living in the cells of *Rhizolenia styliformis* and *Hemialulis delicatus*.

6. Aulosira.

A small, saltwater genus of three or four species; filaments, free, equal, scattered or fasciculate. *A. Schauinslandii* Lemm.; collected on *Turbinaria* at Laysan.

7. Microchaete.

A cosmopolitan genus of seven species, in fresh and salt waters; plants small, aggregated in star-shaped or cushion-shaped tufts; filaments unbranched, erect, attached at base. *M. Vitiensis* Askenasy; plant-mass loosely caespitose, tomentose, short; collected growing on *Liagora coarctata* at Laysan.

8. Hormothamnion.

A genus of two species, occurring in the Atlantic and Pacific Oceans; plant-mass formed from filaments growing together in a longitudinal manner. *H. solutum* Bornet & Grunow; plant-mass floccose, entangled, mucous, green or blue-green; here and there along the coral reefs; not uncommon in shallow water and salt pools.

V. SCYTONEMACEAE.

A family of six genera, widely distributed; filaments branched and with false branches.

1. Plectonema.

A cosmopolitan genus of twelve or more species; filaments free or forming a flat felt-like mass, branched. *P. nostocarum* Bornet; filaments graceful, elongate, at first much-branched, later sparingly branched; collected in hot water in the vicinity of Kilauea Crater.

2. Scytonema.

A large genus of nearly fifty species, abundant in fresh water and on moist soil, widely distributed; filaments branched. *S. rivulare* Borzi; plant-mass widely expanded, woolly, blackish, verging toward red; forming dark-brownish or purplish-red cushions on stones in the mountain streams; plentiful. *S. crispum* (Ag.) Bornet; plant-mass caespitose, entangled, woolly, green, becoming brown or olive; in ponds, rice fields, taro patches, and other quiet or stagnant waters. *S. azureum* Tilden; cell contents deep purple-blue; with other algae forming a layer covering rocks on the bottom and sides of the hot spring in Puna, Hawai'i. *S. varium* Kuetz.; plant-mass 2-3 mm. high, cushion-shaped, bluish-green or brownish; on wet cliffs near waterfalls. *S. javanicum* (Kuetz) Bornet var. *Hawaiense* Lemm.; plant-mass cushion-shaped, dark blue-green; collected among the wet mosses in the vicinity of Kilauea Crater, Hawai'i. *S. ocellatum* Lyngb.; plant-mass cushion-shaped, black or gray, becoming bluish; on moist shaded rocks and wet cliffs. *S. guyanense* (Montagne) Born. & Flah.; plant-mass dense, cushion-shaped, 1-2 mm. thick, widely expanded, blackish-green; on moist stones. *S. mirabile* (Dillwyn) Born.; plant-mass woolly, widely expanded, spongy tomentose, brownish-black or blackish-green; collected in shallow stagnant pools, Mauna Kea, Hawai'i. *S. fuliginosum* Tilden; plant-mass thin, bluish-green; forms thin layers on the bottoms of shallow tidal pools, along the platform reefs and rocky shores; fairly common.

3. Tolypothrix.

A cosmopolitan genus of about fifteen species, in fresh water and moist places; filaments branched. *T. lanata* (Desv.) Wartmann; plant-mass caespitose-floccose, blue-green, becoming brownish with age; found in shallow stagnant pools on Mauna Kea, adhering to leaves in the water. *T. distorta* (Hofman-Bang) Kuetz.; plant-mass caespitose-floccose or cushion-like, blue-green or brownish; forming tufts or cushions on stones in the mountain streams; plentiful.

VI. STIGONEMACEAE.

A family of eight genera, inhabiting a great variety of aquatic and humid situations; filaments free, rarely laterally aggregated, scattered, frequently branched.

1. Hapalosiphon.

A cosmopolitan genus of seven or more species, in fresh or hot water, or on the bark of trees; plant-mass caespitose-floccose, thin; filaments free, branched. *H. fontinalis* (Ag.) Bornet; plant-mass dull blue-green, 3 mm. high; found in shallow stagnant pools on Mauna Kea, adhering to leaves.

2. Fischerella.

A genus of three species, widely distributed, and inhabiting moist places and hot waters; plant-masses forming a continuous, more or less expanded layer, often terrestrial. *F. ambigua* (Naeg.) Gomont; plant-mass crustaceous, orbicular, up to 1 mm. thick, brown becoming black; on moist soil in shady places. *F. thermalis* (Schabe) Gomont; plant-mass 0.5 mm. thick, cushion-shaped, woolly, expanded, blackish-olive or blue-green; collected in hot water in the vicinity of Kilauea Crater. var. *mucosa* Lemm., habitat as for the species.

3. Stigonema.

A cosmopolitan genus of over fifteen species, in fresh water and moist situations; plant-mass rigid, blackish-brown, or cushion-like and

soft; filaments free. *S. aerugineum* Tilden; plant-mass forming a brown, membranous layer on the bottoms of shallow quiet pools. *S. ocellatum* (Dillwyn) Thuret; plant-mass cushion-shaped, woolly, brownish; in shallow quiet pools. *S. minutum* (Ag.) Hassall; plant-mass crustaceous or cushion-like, thin, fragile, blackish; collected on moist stoney soil near Hilo, Hawai'i.

VII. RIVULARIACEAE.

A family of eleven genera, in a great variety of habitats thruout the world.

1. Calothrix.

A cosmopolitan genus of nearly forty species; plant-mass consisting of penicillate tufts or a soft, velvety expansion; filaments simple or slightly branched. *S. confervicola* (Roth) Ag.; filaments gregarious, stellately fasciculate, attached, rigid; collected on marine algae, at Laysan. *C. aeruginea* (Kuetz.) Thuret; filaments forming a somewhat continuous light blue-green layer on the surfaces of larger algae; common in tidal pools along the coral platforms and rocky shores. *C. crustacea* Thuret; plant-mass caespitose, velvety, widely expanded, blackish green or brownish; epiphytic on other algae in tidal pools along the coral platforms and rocky places. *C. fusca* (Kuetz.) Bornet & Flah.; filaments scattered or gregarious; living within the colonies of gelatinous algae; in ditches, taro patches, and rice fields. *C. Sandvicensis* (Nordst.) Schm.; epiphytic on filaments of *Pithophora affinis*, in shallow water. *C. rhizolentiae* Lemm.; collected in plankton between Hawai'i and Laysan, on *Rhizolentia* and *Hemiallus*.

2. Rivularia.

A cosmopolitan genus of twenty-five or more species, in fresh and salt water; colonies spherical, hemispherical, or inflated and lobed, solid or hollow; sometimes confluent into an indefinite mass. *R. natans* (Hedwig) Welwitsch; colonies spherical, hollow, soft, dull olive green; forming soft brown velvety masses, in rice fields and taro patches.

CLASS CHLOROPHYCEAE, THE GREEN ALGAE.

A very large and widely distributed class, of about twenty-five families, eighteen of which are represented in the Hawaiian Archipelago.

I. SPHAERELLACEAE.

This cosmopolitan family of unicellular, free-swimming forms has one genus recorded from Hawaiian waters.

1. Haematococcus.

This genus is often referred to Sphaerella. *H. pluvialis* Flotow; occurs thruout the islands in shallow pools and streams, often forming reddish patches. It is a cosmopolitan species, like its congener the "red snow", *H. nivalis*. *H. thermalis* Lemm.: is abundant in the warm springs of Puna, Hawai'i, and is endemic to this region.

II. VOLVOCACEAE.

A large family, mostly confined to fresh water, but a few species inhabiting the seas. Seventeen or more genera, of which one is recorded from Hawaiian waters.

1. Gonium.

A small genus, of two or three species, inhabiting fresh waters thruout the world. *G. sociale* (Duj.) Warm.: occurs in ponds, taro

patches, etc., thruout the islands. Other well-known genera, such as *Volvox*, *Pandorina*, and *Eudorina*, have not been reported as yet from the islands.

III. TETRASPORACEAE.

A fresh water family, with a few marine species; found in all parts of the earth; comprising ten or more genera.

1. *Dactylococcus*.

A small genus of three species, widely distributed in fresh waters. *D. infusionum* var. *minor* Nordst.; a widely known species; in streams and shallow water.

2. *Dictyosphaerium*.

Another small fresh water genus; of wide distribution. *D. pulchellum* Wood; a fairly common species.

IV. PLEUROCOCCACEAE.

A large family of fifteen genera, chiefly inhabiting fresh water and moist places; a few marine forms.

1. *Gloeocystis*.

G. gigas (Kuetz.) Lagerh.; has been collected from swamps on the slopes of Mauna Kea.

2. *Raphidium*.

A small, fresh water genus, thruout the world. *R. polymorphum* Fres.: a cosmopolitan species, occurs thruout the islands in fresh water.

3. *Schroederia*.

S. setigera Lemm.; in pools and streams.

4. *Closteriopsis*.

C. longissima Lemm.; in pools and streams.

5. *Oocystis*.

A genus of about ten species, in fresh or brackish water in all parts of the world. *O. Naegeli* A. Br.; has been collected from the swamps of Mauna Kea.

6. *Scenedesmus*.

A genus of about ten species, in fresh water thruout the world. *S. quadricauda* (Turp.) Breb.; in pools and reservoirs thruout the islands. var. *Oahuensis* Lemm.; has been collected on Oahu.

V. CHARACIACEAE.

1. *Characium*.

A cosmopolitan genus of 35-40 fresh-water species. *C. ensiforme* Herm.; collected from swamps on Mauna Kea. *C. minutum* A. Br.; in wet caves and other moist places. *C. groenlandicum* Richter; found growing on crustaceans in the Moloka'i fish-ponds.

VI. HALOSPHAERACEAE.

1. *Halosphaera*.

A monotypic genus; oceanic. *H. viridis* var. *gracilis* Lemm.; collected in plankton between Hawai'i and Laysan.

VII. HYDRODICTYACEAE.

A cosmopolitan family, in fresh or slightly brackish waters.

1. *Pediastrum*.

A widely distributed fresh water genus of 25 or more species. *P. integrum* var. *Braunianum* (Grun) Nordst. *P. Boryanum* (Turp.) Menegh. *P. duplex* var. *clathratum* A. Br. var. *reticulatum* Lagerh. *P. tetras* (Ehrenb.) Ralf. *P. bidentulum* var. *ornatum* Nordst.

2. *Hydrodictyon*.

A cosmopolitan, monotypic genus. *H. reticulatum* (L.) Lagerh.; is plentiful in rice fields, taro patches and other shallow waters. It is called pala-wai by the natives, and sometimes used by them for food. The name is also applied to a number of other green fresh-water algaee.

VIII. OPHIOCYTACEAE.

1. *Ophiocytium*.

A genus of seven or eight species, widely dispersed in fresh water. *O. gracilipes* A. Br.; a free-swimming form, in shallow waters, and also in wet caves.

IX. CONFERVACEAE.

1. *Conferva*.

A genus of many species, 40-50, in fresh water in all parts of the earth; thallus filamentous, unbranched, the filaments silky. *C. bombycinia* var. *minor* Wille; cosmopolitan. *C. Sandwicensis* Ag.; confined to these islands, in rice fields, pools, and streams.

X. ULVACEAE.

The Sea Lettuces, a widely distributed family, in salt and fresh water; five genera, of which three occur in Hawaiian waters.

1. *Monostroma*.

A salt water genus of about 30 species; several of these occur in brackish pools and lagoons along the reefs, thallus thin, membranous, of a single layer of cells, often imbedded in jelly; at first sack-like, later rupturing and expanded.

2. *Ulva*.

A widely dispersed genus of about 20 species, in salt or brackish water; thallus bright green, thin membranous, expanded; when removed from the water it resembles wet green tissue paper. *U. rigida* Ag.; has been collected on Laysan.; also occurs along the coral reefs of the other islands, ex. Oahu. *U. fasciata* Delile; frond stipitate, simple or divided into acute segments. *U. lactuca*, forma *genuina* Hauck.; var. *lasciniata* (Wulf.) J. Ag.; these three forms are common in shallow waters along the coasts and coral reefs. Frequently great quantities are thrown up on the beaches by high tides or lee storms. *Fasciata* is known to the natives by the names limu paha-paha or limu pa-laha-loha; *lactuca* is called limu lipa-laha-laha or limu paka-ea. These grow in quiet water near the shore, and are easily gathered. When air-dry, these Ulvas have about 18% water, 14% protein, 50% starches, sugars, etc., and 15% ash.

3. *Enteromorpha*.

A large, abundant and widely distributed genus of about 35 species, in fresh and salt waters; thallus green, filiform or obviously tubular-cylindric; simple or ramified, the divisions tubular-saccate. *E. flexuosa* (Wulf.) Ag.; on stones, etc., along the beaches; in Hono-

lulu harbor; a cosmopolitan species. *E. Hopirkii* Ag.; an obscure species. *E. intestinalis* (L.) Link.; cosmopolitan, with numerous varieties and forms. *E. linza* (L.) J. Ag.; cosmopolitan, with several varieties. *E. plumosa* Kuetz.; cosmopolitan. *E. prolifera* (Muell.) J. Ag.; cosmopolitan. var. *tubulosa* Kuetz. *E. compressa* (L.) Grev.; cosmopolitan, with numerous varieties. var. *trichodes* Kuetz. These all grow in shallow salt or brackish waters along the coast, and in brackish pools and ditches. They are usually very abundant at the mouths of streams, in the brackish water. They are easily gathered, and are all considered edible by the natives. These algae, called limu ele-ele, are among the most abundant, most popular, and most widely used of the edible algae. They are commonly on sale at the native markets. Chemical analyses of air-dry material show about 13% water, 12-19% protein, 50% fats and carbohydrates exclusive of crude fiber, and 10-20% ash.

XI. ULOTHRICHIAEAE.

A widely distributed family of seven or more genera, in fresh water and moist places, and in brackish water; rarely in salt water.

1. *Ulothrix*.

A large genus of over 30 species, in fresh, brackish, and salt water, in all parts of the world, filaments grass-green, soft and flaccid, unbranched, at first forming tufts, attached, later entangled. *U. subtilis* Kuetz. *U. minulata* Kuetz. These two species occur in rice fields, taro patches, ditches, and other similar situations. The yellow-green, unbranched, decumbent, soft, hair-like fleece is attached to the bottom, or rocks; under dripping water it forms a bright green crust.

XII. CHAETOPHORACEAE.

A family of thirteen genera; chiefly inhabiting fresh water, a few species in salt or brackish water; widely distributed.

1. *Stigeoclonium*.

A cosmopolitan genus of about 30 species, in fresh water; thallus gelatinous, thin, caespitulose, epiphytic or on wet rocks. *S. Falklandicum* Kuetz.; called limu pala-wai or limu li-pala-wai by the natives, and used by them for food. Occurs in streams and pools; fairly abundant; also in numerous north temperate regions. *S. amoenum* Kuetz.; called limu hulu-ilio, grows in brackish ponds by the sea; eaten by only a few of the natives, a cosmopolitan species with many varieties. *S. tenue* Kuetz.; frequently grows on the vertical cliffs of waterfalls, and becomes 12-14 inches long; a cosmopolitan species with many varieties.

2. *Draparnaldia*.

A cosmopolitan fresh-water genus, of about 17 species; filaments branched, in penicillate fascicles. *D. macrocladia* Nordst.; occurs in streams and pools; fairly common; for example, Manoa Stream, Nu'uuanu Stream, Kalihi, etc., recorded only from the Hawaiian Islands.

3. *Aphanochaete*.

A cosmopolitan fresh-water genus, of about 17 species; filaments branched, decumbent filaments. *A. repens* A. Br.; occurs in taro patches, swamps, etc.; often epiphytic on such plants as *Cladophora*:

also in moist caverns, on the walls and floors, ex. Makiki Valley; a cosmopolitan species, occurring in Europe and New Zealand.

4. *Chaetosphaeridium.*

C. globosum (Nordst.) Klebehn; widely distributed in fresh water; thallus sub-globose, of branched procumbent filaments.

XIII. OEDOGONIACEAE.

A cosmopolitan family of two genera, in fresh or slightly brackish waters.

1. *Oedogonium.*

A cosmopolitan genus of nearly 200 species, filaments not branched; vegetative cells cylindric. *O. obsoletum* Wittr.; in brackish waters; also in Europe and N. America. *O. globosum* Nordst.; in streams; recorded only from Hawaiian Islands. *O. crispum* var. *Hawaiense* Nordst.; in swamps and pools; a cosmopolitan species with numerous varieties. *O. Pringsheimii* forma *pachydermatosporum* (Nordst.) Hirn.; collected in Mauna Kea swamps; a cosmopolitan species with numerous varieties. *O. acrosporum* var. *majusculum* Nordst.; collected in Mauna Kea swamps; a cosmopolitan species with numerous varieties. *O. longicolle* Nordst.; in pools and ditches; there are several varieties. A number of these species are plentiful in the mountain streams, and in the vicinity of waterfalls.

2. *Bulbochaete.*

A cosmopolitan genus of about 45 species, with branching filaments, inhabiting fresh or slightly brackish waters. *B. varians* Wittr. var. *hawaiensis* Nordst., widely distributed in temperate regions, as well as in the tropics. *B. rectangularis* Wittr. var. *hiloenensis* Nordst.; another widely distributed species with numerous varieties.

XIV. COLEOCHAETACEAE.

A monogeneric family of six to eight cosmopolitan fresh-water species, represented in the islands by

1. *Coleochaete.*

C. orbicularis Pringsh.; thallus minute, orbicular, 2-3.5 mm. diam.; *C. irregularis* Pringsh.; thallus irregular, bright green, filaments decumbent; cosmopolitan, on aquatic plants.

XV. CLADOPHORACEAE.

A widely dispersed family of six genera, in fresh and salt water, and inhabiting a variety of situations.

1. *Chaetomorpha.*

A large genus of fifty species, extending from pole to pole, in fresh, salt, and brackish water. The filaments are branched, often forming tufts or dense masses. Abundant around wharves, ditches, tidal pools, etc. *C. Pacifica* Kuett.; abundant along the shores; occurs in all tropical waters; filaments grass green, coarse and rigid.

2. *Cladophora.*

A very large genus of 200-300 species, inhabiting all waters; well represented in the Hawaiian flora; thallus floating or attached, filaments highly branched, firm, not gelatinous; common. *C. fracta* (Dillw.) Ag.; in streams and damp caverns, a cosmopolitan species.

with numerous varieties. *C. inserta* Dickie; in brackish pools along the coasts. *C. Nordstadii* De T.; pools and swamps of fresh water. *C. composita* Hary. & Hook.; thallus pulvinate, spongiouse, pale green; filaments delicate membranous, pellucid. *C. nitida* Kuetz.; this species is called limu hulu-ilio by the natives, and is sometimes used for food; it occurs in mountain streams and pools. *C. composita contracta* Brand; along the leeward shores of Oahu. *C. Montagnei Waianaeana* Brand; these two occur in shallow water along the coral reefs and shoals; this species is Cuban. *C. antennina* (Bory) Kuetz.; this and several other species are used locally by the natives for food, chiefly on Maui and Hawai'i. They are called limu hulu-ilio "dog's hair", limu ilio, or limu manu.

XVI. BRYOPSIDACEAE.

A monogeneric family of one species, in all oceans, but most abundant in warm and tropic seas; thallus unicellular, filiform, branched.

1. *Bryopsis*.

About 25 species, in all seas, most abundant in tropics; fronds tubular, elongate, upper part pinnatifid, bright-green. *B. plumosa* Kuetz.; plentiful in quiet shallow water, on sandy bottoms, along the coral reef; also occurs in many other seas; fronds 2-6 ins. long, often gregarious, highly pinnatifid.

XVII. CAULERPACEAE.

A family of two genera, of wide distribution, but most abundant in tropical waters.

1. *Caulerpa*.

A genus of about 80 species, in tropical and subtropical seas. *C. pinnata* (L.) Web.; collected at Laysan. *C. racemosa* var. *laetevirens* Web.; collected at Laysan; the species is known from the Red Sea; there are several varieties. *C. laxifolia* (Vahl.) Ag.; plentiful along the leeward coral reefs in shallow waters and tidal pools; resembling a miniature lycopodium, thruout the Pacific and Indian Oceans.

XVIII. CODIACEAE.

A family of eight genera, widely dispersed in temperate and tropical oceans, most abundant in the latter.

1. *Halimeda*.

A genus of about 20 species, in temperate and tropic waters; thallus lobed, often incrusted with lime; an important reef-builder. *H. tuna* (Ell. & Sol.) Lam.; is abundant in the shallow waters along the coral reef, its jointed erect thallus strikingly resembling a miniature prickly pear cactus; a cosmopolitan species. *H. opuntia* (L.) Lam.; has been collected at various points along the reef, and also at Laysan; a cosmopolitan species, with many varieties and forms.

2. *Codium*.

A genus of about 20 species, in temperate and tropic waters; thallus spongiouse, spherical, crustaceous, or cylindric-filiform. *C. adhaerens* (Cabr.) Ag.; fronds form a sheet on the substratum; periphery excrescent; cosmopolitan. *C. tomentosum* (Huds.) Stackh.; these two are called limu a-ala-ula by the natives, and are plentiful in shallow water along the reefs; fronds cylindric, elongate, dark

green; cosmopolitan. **C. Muelleri** Kuetz.; is called limu a-ala-ula and also on Hawai'i, limu wawae-iole and limu wawae-moa. It also occurs in shallow waters along the coasts; often on exposed rocks in the surf, or on the outer margins of the reefs. The Codiums all have stout holdfasts, and require a knife or chisel for collecting.

XIX. VALONIACEAE.

A marine family of eleven genera, chiefly in tropical seas.

1. Valonia.

A tropical genus of about 20 species; fronds irregularly tubular or vesicate, simple or sparingly ramified. **V. aegagropila** (Roth) Ag.; cosmopolitan in all warm seas. **V. confervoides** Harv.; cosmopolitan in all warm seas. **V. urticaris** Ag.; called limu li-puu-puu by the natives, and used by them for food. These species all live along the coral reefs; also occur in all warm seas.

2. Dictyosphaeria.

A small genus of three or more tropical species. **D. favulosa** (Ag.) Dcne.; common along the reefs and coasts in shallow water; also collected at Laysan, and occurring in all warm seas; fronds vesiculose, roundate-hemispheric.

3. Microdictyon.

A small tropical genus of five species; thallus reticulate. **M. umbilicatum** (Velley) Zanard; delicate, leaf-like, netted thalli; fairly common in pools and shallows along the coral reefs; a cosmopolitan species in all warm seas.

XX. PITHOPHORACEAE.

A monogeneric family, with about ten forms, widely distributed in fresh and salt waters, chiefly marine.

1. Pithophora.

Thallus composed of two distinct parts,—a branching, erect stem, and a basal, rhizoid-like part. **P. affinis** Nordst.; native name, limu pala-wai or li-pala-wai; recorded only from the Hawaiian Islands.

CLASS CHARALES.

CHARACEAE.

A cosmopolitan family of six genera, inhabiting fresh and brackish waters.

1. Nitella.

A cosmopolitan genus of about 80 species, in fresh and brackish waters. **N. Hawaiensis** Nordst.; in streams, brackish ditches, and pools.

2. Chara.

A cosmopolitan genus of about 70 species, in fresh and brackish water. **C. coronata** var. leptosperma forma Oahuensis (Meyen) A. Br.; in ditches and pools. **C. gymopus** var. armata (Meyen) Nordst.; on all the islands, in ditches, shallow pools, etc.

CLASS CONJUGATAE.

I. ZYGNEMACEAE.

A very widely distributed family of four genera, in fresh or slightly brackish water.

1. Mougeotia.

A cosmopolitan genus of about 45 species; filaments simple, cells cylindric; chlorophores single, axile. *M. capucina* (Bory) Ag.; in pools and swamps; cosmopolitan, from Scotland to New Zealand; dark violaceous.

2. Zygnema.

A cosmopolitan genus of about 40 species; filaments simple; chlorophores star-shaped. *Z. spontaneum* Nordst.; in ditches, taro patches, rice fields, etc.; known only from the Hawaiian Islands.

3. Spirogyra.

A familiar and cosmopolitan genus of about 75 species; represented in the Hawaiian flora by a number of species, abundant in streams and pools, both in the mountains and on the lowlands; a number of them are used by the natives as food, and called limu pala-wai.

II. DESMIDACEAE.

A very large and widely dispersed family of about thirty genera, largely confined to fresh water; a few forms in brackish water and in the sea. They occur in a great variety of habitats, wherever there is sufficient moisture for their growth. The following lists of Hawaiian desmids and diatoms are adapted mainly from Lemmermann's list:

Desmidium aptogonium var *acutius* Nordst.; *Gymnozyga moniliformis* Ehrenb.; *Gonatozygon Ralfsii* De Bary; *Cylindrocystis Brebissonii* Menegh.; *Closterium didymotocum* var *multinucleatum* Nordst.; *C. praelongum* Breb.; *C. Pritchardianum* Archer; *C. lineatum* var *sandvicense* Nordst.; *C. dianae* Ehrenb.; *C. parvulum* Naeg.; *C. moniliferum* (Bory) Ehrenb.; *C. setaceum* Ehrenb.; *Penium lamellosum* Breb.; *P. navicula* Breb.; *Tetmemorus granulatus* forma *minor* Nordst.; *T. levis* var *continuus* Nordst.; *Disphinctium palangula* (Breb.) Hansg.; *D. subglobosum* (Nordst.) De Toni; *D. connatum* (Breb.) De Bary; *D. annulatum* (Naeg.); *D. speciosum* var *simplex* Nordst.; *Pleurotaenium trabecula* (Ehr.) Naeg.; *P. Ehrenbergii* (Ralfs.) Delp.; *P. indicum* (Gren.) Lund.; *P. nodulosum* (Breb.) De Bary; *Xanthidium armatum* var *fissum* Nordst.; *Cosmarium granatum* var *subgranatum* Nordst.; *C. Meneghini* Breb.; *C. crenatum* Ralfs.; *C. Holmiense* Lund.; *C. parvulum* Breb. forma *spetbergenensis* Nordst.; *C. sulcatum* Nordst.; *C. depauperatum* Nordst.; *C. anisochondrum* Nordst.; *Arthrodesmus octocornis* forma *hawaiiensis* Nordst.; *Euastrum binale* (Turp.) Ralfs.; *E. ansatum* Lund.; *E. sinuosum* Lenorm.; *Micrasterias truncata* (Corda) Breb.; *M. adscendens* Nordst.; *Straurastrum subtile* Nordst.; *S. spongiosum* var *griffithianum* (Naeg.) Lagerh.; *S. subscabrum* Nordst.; *S. muticum* Breb.; *S. monticulosum* var *duplex* Nordst.; *S. margaritaceum* Ehrenb.; *S. tenuissimum* West.

This gives a total of fifteen genera and forty-seven species.

CLASS FLAGELLATAE.

The Flagellates that have been recorded from the Hawaiian Islands are as follows: **Fam. Craspedomonadaceae**—*Salpinocoeca pyxidium* S. K. **Fam. Hymenomonadaceae**—*Dinobryon sertularia* Ehrenb. **Fam. Euglenaceae**—*Euglena spirogyra* Ehrenb., *Phacus pyrum* (Ehrenb.) Stein; *P. pleuronectes* Nitzsch; *Trachelomonas volvocina* Ehrenb.; var *minuta* Lemm.; *T. oblonga* Lemm.; var *truncata* Lemm.; *T. hispida* (Perty) Stein. These forms were collected

in ditches, taro patches, rice fields, and fish ponds, in quiet, shallow waters.

CLASS SILICOFLAGELLATAE.

Several species have been taken in plankton between Hawai'i and Laysan, as follows: *Dictyocha fibula* var. *messanensis* (Haeckel) Lemm.; var. *stapedia* (Haeckel) Lemm.; *Distephanus speculum* (Ehrenb.) Haeckel.

CLASS PERIDINIALES.

A large number of this class have been taken in plankton between Hawai'i and Laysan. **Fam. Pyrocystaceae**—*Pyrocystis fusiformis* Wyy.; *P. pseudonoctulica* Wyy.; *P. lunula* Schuett. **Fam. Gymnodiniaceae**—*Hemidinium nasatum* Stein. **Fam. Peridiniaceae**—*Pyrophacus horologium* Stein; *Ceratium candelabrum* (Ehrenb.) Stein; *C. furca* (Ehrenb.) Clap. & Lachm.; *C. fusus* (Ehrenb.) Duj.; var. *concavum* Gourr.; var. *extensem* Gourr.; *C. gibberum* Gourret; var. *contortum* Gourr.; *C. gravidum* Gourret.; *C. lineatum* Ehrenb.; *C. tripos* (Mueller) Nitzsch; var. *arcticum* (Ehrenb.) Cleve; var. *arcuatum* Gourret; var. *horridum* Cleve; var. *macroceros* (Ehrenb.) Clap. & Lachm.; *Gonyaulax polyedra* Stein; *G. polygramma* Stein; *Goniodoma armatum* (Schuett) Schmidt; *Diplopsalis lenticula* Bergh.; *Peridinium divergens* Ehrenb.; var. *depressum* (Bail.) Cleve.; var. *rhomboideum* Lemm.; *P. inconspicuum* Lemm.; *Oxytoxum Schauinslandii* Lemm.; *Ceratocorys horrida* Stein; var. *longicornis* Lemm.; *Phalacroma mitra* Schuett; *Aphisolenia palmata* Stein; *A. Schauinslandii* Lemm.; *Histioneis quadrata* (Schuett) Lemm.; *H. Steinii* (Schuett) Lemm.

CLASS BACILLARIALES.

The diatoms are represented by a large number of forms.

Fam. Melosiraceae—*Melosira Juergensii* Ag.; *Gallionella nummuloides* (Dill) Bory; *Paralai sulcata* (Ehrenb.) Cleve.; *Hyalodiscus subtilis* Bail.; *H. Scoticus* (Kuetz.) Grun. **Fam. Sceletonemaceae**—*Sceletonema costatum* (Grev.) Cleve. **Fam. Coscinodiscaceae**—*Cyclotella striata* (Kuetz.) Grun.; *Coscinodiscus eccentricus* Ehrenb.; *C. dimorphus* Castr. **Fam. Stictodiscaceae**—*Archnoidiscus ornatus* Ehrenb. **Fam. Asteropampraceae**—*Asteropampra Marylandica* Ehrenb.; *A. rotula* Grev. **Fam. Aulacodiscaceae**—*Aulacodiscus orientalis* Grev. **Fam. Pyrgodiscaceae**—*Pyrgodiscus calyciflos* Temp. & Brun. **Fam. Eupodiscaceae**—*Actinocyclus ornatus* Rattr.; *A. Ralfsii* (W. Sm.) Ralfs; *A. splendens* Rattr.; *A. Ehrenbergii* Ralfs; *A. subtilis* (Greg.) Ralfs. **Fam. Rhizosoleniaceae**—*Guinardia elongata* Lemm.; *Rhizosolenia semispina* Hensen; *R. setigera* Brightw.; *R. styliformis* Brightw.; *R. temperi* var. *acuminata* Perag. **Fam. Chaetoceraceae**—*Bacteriastrum varians* Lauder; *Chaetoceros diversum* var. *tenu* Cleve; *C. laciniosum* Schuett; *C. peruvianum* Brightw. **Fam. Eucamptiaceae**—*Climacodium Jacobi* Cleve. **Fam. Triceratiaceae**—*Triceratium arcticum* Brightw.; *T. dubium* Brightw.; *T. zonatula* Grev.; *T. punctatum* Brightw.; *T. Shadboldtianum* var. *robustum* Lemm. **Fam. Biddulphiaceae**—*Biddulphia pulchella* Gray; *B. reticulata* Roper; *B. imperialis* Walker. **Fam. Isthmiaceae**—*Isthmia nervosa* Kuetz.; *Isthmiella enervis* (Ehrenb.) Clev. **Fam. Hemiaulaceae**—*Hemiaulus hauckii* Grun.; *H. delicatus* Lemm. **Fam. Anaulaceae**—*Terpsinoe musica* Ehrenb.; *T. australis* Ehrenb. **Fam. Tabellariaceae**—*Rhabdomena adriaticum* Kuetz.; *R. robustum* Grun.; *Tabellaria platystoma* Ehrenb.; *T. rhabdostoma* Ehrenb.; *Climacosira mirifica* (W. Sm.) Grun.; *Striatella deliculata* (Kuetz.) Grun.; *Grammatophora marina*

(Lyngb.) Kuetz.; var. *communis* Grun.; var. *macilenta* W. Sm.; *G. Haviensis* Mereschk.; *G. angulosa* Ehrenb.; var. *hamulifera* (Kuetz.) Grun. **Fam. Entopylaceae**—*Gephyria media* Arnott. **Fam. Meridionaceae**—*Opephora pacifica* (Grun.) Petit; *Licmomerpha flabellata* (Carm.) Ag.; *L. remulus* Grun.; *L. Ehrenbergii* var. *tenuistriata* Mereschk.; *L. dubia* Grun.; *L. Grunowii* var. *elongata* Mereschk.; *L. juergensii* Ag.; *Climacosphenis moniligera* Ehrenb.; *C. elongata* Mereschk. **Fam. Fragilariaeae**—*Fragilaria capucina* Desmaz.; *F. lamella* Ehrenb.; *Rhaphoneis setacea* Ehrenb.; *Synedra ulna* var. *splendens* (Kuetz.) Brun; *S. acus* Kuetz.; *S. radians* Kuetz.; *S. pulchella* (Ralph) Kuetz.; *S. affinis* Kuetz.; var. *Sandwicensis* Grun.; *Ardissonia fulgens* (Grev.) Grun.; *A. superba* (Kuetz.) Grun.; *A. robusta* (Ralfs) De Not.; *Toxarium undulatum* Bail.; *T. semilunare* Lemm.; *T. Kennedyanum* (Greg.) Grun.; *T. rostratum* Hantz.; *Asterionella formosa* Hass.; *A. notata* Grun. **Fam. Eunotiaceae**—*Eunotia pectinalis* (Kuetz.) Rabenh. **Fam. Achanthaceae**—*Aethanthes glabrata* (Grun.) Cleve.; *A. lanceolatum* Breb.; *A. breviores* var. *angustata* Grev.; var. *penhaeformis* Grev. **Fam. Cocconeidaceae**—*Campyloneis grevellei* W. Sm.; var. *typica* Cleve.; *Cocconeis pellucida* Hantzsch; *C. pseudomarginata* Greg.; var. *intermedia* Grun.; *C. heteroidea* Han.; var. *sigmoidea* Grun. **Fam. Navicularaceae**—*Navicula* (*Caloneis*); *C. liber* var. *linearis* Grun.; var. *genuina* forma *tenuistriata* Cleve; *C. formosa* Greg.; (*Diploneis*) *D. papula* A. S.; *D. splendida* Greg.; *D. Schmidtii* Cleve; *D. weissflogii* A. S.; *D. notabilis* Grev.; *D. vaillans* A. S.; *D. nitescens* Greg.; *D. crabro* var. *multicostata* Grun.; var. *minuta* Cleve; *N. cuspidata* var. *ambigua* Ehrenb.; *N. pupula* Kuetz.; *N. confervacea* Kuetz.; *N. anceps* var. *obtusa* Grun.; (*Trachyneis*) *T. aspera* Ehrenb.; var. *pulchella* W. Sm.; *T. antillarum* var. *mereschk* Cleve; *T. velata* A. S.; *N. cryptocephala* Kuetz.; *N. rhyncocephala* Kuetz.; var. *amphiceros* Kuetz.; *N. consors* A. S.; *N. cancellata* var. *gregorii* Ralfs; *N. zostereti* Grun.; *N. Brasiliensis* Grun.; *N. concilians* Cleve.; *N. Kennedyi* var. *Tahitiensis* Cleve; (*Pinularia*) *P. appendiculata* Ag.; *P. interrupta* forma *stauroneiformis* (V. H.) Cleve; *P. divergens* W. Sm.; *P. borealis* Ehrenb.; *P. stauropelta* var. *interrupta* Cleve; *P. acrosphaeria* forma *maxima* Cleve; *P. major* Kuetz.; *P. viridis* Nitzsch; *Pleorosigma* *Balticum* (Ehrenb.) W. Sm.; *P. formosum* W. Sm.; *P. rigidum* W. Sm.; *P. angulatum* W. Sm.; *Tropidoneis* *lepidoptera* var. *Samoensis* Grun.; *Mastogloia decussata* Grun.; *M. fimbriata* Brightw.; *M. minuta* Grev.; *M. exigua* Lewis; *M. goesii* Cleve.; *M. citrus* Cleve.; *M. pumila* Grun.; *M. quinquecostata* var. *concinna* A. S.; *M. electa* A. S. **Fam. Gomphonemaceae**—*Gomphonema parvulum* Kuetz.; *G. gracile* var. *dichotomum* W. Sm.; *G. lanceolatum* Ehrenb.; *G. subclavatum* Grun.; *G. olivaceum* var. *tenellum* Kuetz.; *Rhiocosphenia curvata* (Kuetz.) Grun. **Fam. Cymbellaceae**—*Amphora ovalis* (Brem.) Kuetz.; var. *pediculus* (Kuetz.) V. H.; *A. coffaeiformis* Ag.; *A. lineolata* Ehrenb.; *A. angusta* var. *eblongella* Grun.; *Rhopalodia gibba* (Ehrenb.) O. M.; *R. musculus* (Kuetz.) O. Mueller; *R. gibberula* var. *minuens* O. Mueller; var. *Vanheurckii* O. Mueller; var. *minuta* O. Mueller. **Fam. Nitzschiaeae**—*Nitzschia penduriformis* Greg.; var. *minor* Grun.; *N. sub-costata* Grun.; *N. Janischii* Grun.; *N. angularis* W. Sm.; *N. sigmoidea* (Nit.) W. Sm.; *N. vermicularis* (Kuetz.) Hant.; *N. sigma* (Kuetz.) W. Sm.; var. *intercedens* Grun.; var. *rigidula* Grun.; var. *curvula* (Ehr.) Brun; *N. obtusa* var. *nana* Grun.; *N. linearis* (Ag.) W. Sm.; *N. palea* (Kuetz.) W. Sm.; *N. ventricosa* Kitton; *N. lorenziana* var. *major* Grun.; *N. curvirostris* Cleve; var. *closterium*

(Ehrenb.) V. H.; *N. acicularis* (Kuetz.) W. Sm.; *N. longissima* (Breb.) Ralfs; *N. pungens* Grun.; var. *atlantica* Cleve. **Fam. Surirellaceae**—*Surirella fastuosa* Ehrenb.; *S. anfractosa* A. Sc.; *Podocystis adriatica* Kuetz.; *Campylodiscus Grevillii* Leud.-Form.; *C. Kittonianus* Grun.

CLASS PHAEOPHYCEAE: THE BROWN ALGAE.

Comprising 19 families and widely distributed thruout the oceans of the world. Mostly marine; a few freshwater forms. Represented in the Hawaiian flora by only four families, and exceedingly sparse as compared with such regions as the northwestern coast of America.

I. ECTOCARPACEAE.

A family of ten genera, most numerous in the North Atlantic, but widely distributed in other oceans. One genus in Hawaiian waters.

1. *Ectocarpus*.

A genus of 30-40 species, widely scattered in all oceans, fronds filamentous, monosiphonous or occasionally partly polysiphonous. *E. simpliciusculus* var. *Vitiensis* Asken.; along the coasts, often on other algae ex. *Turbinaria*; also collected at Laysan. *E. Indicus* Sonder; plentiful along the coasts, in shallow water; called limu aka-akoa or limu hulu-ilio by the natives, and used by them as food. *E. paradoxus* Mont.; common along the coasts and reefs.

II. SPHACELARIACEAE.

A cosmopolitan family of ten genera; one in Hawaiian waters.

1. *Sphacelaria*.

A cosmopolitan genus of at least 12 species; fronds olive-green, filamentous, branching. *S. tribuloides* Menegh.; common in shallow waters along the coasts. *S. furcigera* Kuetz.; fairly abundant in pools and shallow waters along the reefs.

III. ENCOELIACEAE.

A cosmopolitan family of 14 genera, two in Hawaiian waters.

1. *Hydroclathrus*.

A monotypic genus in tropic and sub-tropic waters thruout the world. *H. cancelatus* Bory; abundant in shallow waters along the coral reefs; forms a stiff, olive-brown, perforated cushion, several inches broad.

2. *Asperococcus*.

A genus of three species. *A. bulbosus* Lam.; frequent in shallow water along the coasts.

IV. FUCACEAE.

A large cosmopolitan family of 26 genera, chiefly in cold waters. Poorly represented in the Hawaiian flora.

1. *Turbinaria*.

A widely distributed genus of about five species. *T. ornata* J. Ag.; abundant along the outer margin of the coral reefs, where it is exposed to the full force of the surf; often cast upon the beaches in great quantities after storms; very tough and leathery. *T. vulgaris* J. Ag.; habitat as for the preceding, but not so abundant.

2. *Sargassum*.

A very large genus of about 200 species, widely dispersed, throughout warm oceanic waters; thallus highly differentiated, with stems, attachment-disks, leaves, air-bladders; fruits in compound branches. *S. obtusifolium* J. Ag.; known only from the Hawaiian Islands. *S. polypodium* J. Ag., and var. *fissifolium* Grun.; known only from the Hawaiian Islands. *S. densum* Dickie.; known only from leeward Oahu; Honolulu harbor. *S. incisum* Dickie.; known only from leeward Oahu; Honolulu harbor. *S. echinocarpum* J. Ag.; recorded only from Hawaii'i and Fiji. *S. cymosum* Ag.; widely distributed in the Atlantic and Pacific. These are all known as limu kala by the natives, and are used for food. Miss Reed states "Perhaps the limus most abundant and widely distributed over the islands are the various kinds of limu kala. . ." They grow in the shallow waters along the reefs, on stones and submerged ledges, and on the reef itself. In many regions, ex. the leeward coast of Oahu, they are very much more abundant than any other seaweed. Miss Reed describes the native uses of limu kala as follows:

"Limu kala is sometimes broken into small pieces and soaked in fresh water until it turns dark and soft, then stuffed into salmon before it is roasted, or it is chopped with fish heads and salt. Again it is sometimes ripened by putting in water with a few mollusks called leho, salted slightly, and allowed to stand several days before eating. Limu kala is more often than any other limu eaten on the beach, without any preparation other than rinsing off the sand and breaking into convenient pieces for eating with raw fish or squid. It is also sometimes put into meat gravies or stews just as it is served."

CLASS DICTYOTALES.

I. DICTYOTACEAE.

A family of ten or more genera, confined largely to the warm oceans of the world. Four Hawaiian genera.

1. *Stylopodium*.

Monotypic; frond at first decumbent, later ascending. *S. lobatum* Kuetz.; collected at Laysan, flabellate, palmatifid or lobate, concentrically zoned; in many parts of Pacific and Atlantic.

2. *Padina*.

A cosmopolitan genus of nine species; fronds flat, flabellate entire or multifid; zonate. *P. Commersonii* Bory; in shallow water within the lagoons along the reefs; widely distributed in Pacific and Atlantic. *P. Pavonia* (L.) Gaill.; abundant along the coral reefs, in pools and lagoons; often growing where the water is distinctly muddy and brackish; gregarious and forming extensive colonies; widely distributed in Pacific and Atlantic.

3. *Haliseria*.

A genus of 17 species, widely distributed; fronds flat, costate, dichotomous. *H. plagiogramma* Mont.; grows far out on the outer margin of the coral reefs, where the heavy surf breaks, in rather deep water; also in other tropical and subtropical waters of the Atlantic and Pacific, ex. West Indies and Australia; fronds slender, 12-14 cm. tall. It can usually be gathered only by diving or swimming, but grows here and there in small quantities on all the

islands. It is a great favorite among the natives, who call it limu lipoa. Reed states "Limu lipoa is very often pounded and mixed with other seaweeds to give them its peculiar penetrating, spicy flavor and odor. It is frequently served with meats or put into the gravy or stews to give them a peppery flavor, of which the Hawaiians are very fond. All Hawaiians like the odor and flavor of this alga, especially with raw fish. It is considered particularly delicious with raw flying fish, if simply broken and salted slightly." *H. pardalis* Harv.; a very rare species, occasionally washed ashore after storms; also occurs in Australian waters; fronds linear, dichotomous.

4. *Dictyota*.

A cosmopolitan genus of 45 species, chiefly in warm oceans; fronds flat, dichotomous. *D. acutiloba* J. Ag. and var. *distorta* J. Ag.; recorded only from the Hawaiian Islands. *D. Sandvicensis* Sond.-Kuetz.; also in Australian waters, Red Sea, and Indian Ocean. *D. spinulosa* Harv.; various parts of the North Pacific. *D. dichotoma* (Huds.) Lamx.; widely distributed in all oceans. These are all called limu alani but are seldom used for food by the natives, as they are bitter.

II. ATHROCLADIACEAE.

An obscure family of perhaps two genera. widely distributed; fronds filiform, repeatedly branched.

1. *Chonospora*.

A genus of uncertain position, with about four species; fronds cylindric-compressed, repeatedly dichotomous. *C. pannosa* J. Ag.; fronds in a dense caespitose tangle, blackish, 6-10 cm. high, much-branched and interwoven; reported only from the Hawaiian Islands. *C. fastigiata pacifica* J. Ag.; called by the natives limu wa-wahi-wa'a or limu kau-pau, and used by them as food; occurs in various parts of the Pacific, ex. Mexican waters, and also along the Atlantic shores of S. America. Fronds caespitose with numerous dichotomously-branching fastigiate branches, color dark olive.

CLASS RHODOPHYCEAE: THE RED ALGAE.

I. BANGIACEAE.

A family of chiefly marine species, a few (Bangia) inhabiting fresh water; the marine species, altho widely distributed, are most abundant in warm and tropical oceans. Four genera, of which one occurs in Hawaiian waters.

1. *Porphyra*.

A genus of about twenty species, of a gelatinous texture, mostly colored a beautiful purple; often growing in colonies; occurs in all the oceans. *P. leucosticta* Thuret; this is the famous limu lua'u of the natives, a very highly prized delicacy. Miss Reed states that it "appears in winter or spring after heavy storms and lasts for only a few days. It is found on bold exposed rocks constantly dashed by waves, so it is difficult and dangerous to collect it, especially as it is extremely slippery and has to be scraped forcibly from the rocks in small bunches while the collector clings to his support and avoids the heavy waves. He must be sure-footed, quick, and a strong swimmer, if he collect limu lua'u. . . .

It is "prepared by washing in the usual way in fresh water. It is then salted a little and put into clear water, where it becomes slippery and colors the water a lovely violet color. Sometimes opahi, a kind of limpet or mollusk, is put in with the limu and salt and water and placed in bottles or jars. This is used as needed, for it keeps many weeks when placed in the weak brine with the limpets. Limu lu'a'u is considered a great delicacy in the few localities where it occurs, but it lasts so short a season, is so scarce, and so difficult to get that it is not very widely known. Only on northern Kaua'i, northern Maui, and northern Hawai'i is it in use or in great favor, as it does not occur in other places, except a few scattered plants on Moloka'i and Oahu. It grows only on the most exposed and slippery rocks, and disappears in a few days after the stormy weather subsides not to reappear until the next season immediately after the heavy winds. Therefore thus much-prized limu is always most difficult to obtain even in very small quantities."

II. HELMINTHOCLADIACEAE.

A family of ten genera, in fresh and salt waters, chiefly characteristic of tropical and subtropical seas.

1. Liagora.

A genus of about 35 species, chiefly tropical; often calcareous. *L. valida* Harv.; collected at Laysan; also occurs in the Atlantic, and around Madagascar. *L. coarctata* Zanard; collected at Laysan. *L. decussata* Mont.; called limu pu-aki by the natives, and considered edible; growing along the coral reefs in quiet shallow water, often in mud or sand or on small stones; fronds filiform, virgate-ramified, calcareous.

III. CHAETANGIACEAE.

A family of five genera, characteristic of warm seas.

.1. Galaxaura.

A genus of over 20 species, in tropical seas; fronds cylindric or compressed, sub-tubular, incrusted with lime. *G. lapidescens* (Soland) Lamx.; along the coral reefs in shallow waters; a common species in warm seas. *G. spongiosa* Kuetz.; habitat as for the preceding.

2. Scinaia.

A genus of 4-6 species, (exact number unknown), in tropical seas; fronds cylindric, gelatinous-membranous, dichotomous. *S. furcellata* (Turn.) Biv.; and var. *undulata* (Mont.) J. Ag.; fronds solitary or clustered, arising from a disk-like base, several times dichotomous; cosmopolitan with several varieties.

3. Actinotrichia.

A monotypic genus, in the Pacific and Indian Oceans; fronds round, furcate racemose, more or less indurated with lime. *A. rigida* (Lamx.) Desne; widely distributed in the Pacific, Indian and Red Sea.

IV. GELIDIACEAE.

A cosmopolitan family of fifteen or more genera, abundant in tropical and subtropical seas.

1. Gelidium.

A large genus of about 30 species most abundant in tropical waters; fronds pinnatifid. *G. attenuatum*; not listed in De Toni;

probably a synonym. *G. corneum*; not listed in De Toni; probably a synonym. *G. felicinum* Bory; restricted to the Pacific Ocean. *G. intricatum* (J. Ag.) Kuetz. According to De Toni an obscure species. *G. latifolium* Born.: cosmopolitan; abundant in Atlantic and Adriatic. *G. cartilagineum* (L.) Gaill.; in the Pacific and Atlantic Oceans. *G. pusillum* (Stackh.) Le Jol.; a cosmopolitan species. These are all called limu loloa,—sometimes limu ekaha-kaha, by the natives, and are extensively used as food. They grow on exposed black lava rocks near the tide line, in rough water where they are constantly washed by the surf. They have tenacious holdfasts, and require a knife or chisel for collecting. These algae are abundant along the rocky shores of Kaua'i, Oahu, and Moloka'i, and also occur in considerable quantities on the other islands. They produce a dark, viscid gelatine strongly flavored, but suitable for glue-manufacture. Reed states, "Our species of *Gelidium* are undoubtedly as gelatinous as the Japanese species, but they are not nearly so plentiful."

2. Wrangelia.

A genus of about 25 species, in warm oceans of both hemispheres; fronds erect, terete-filiform; branched. *W. penicillata* Ag.: this beautiful, delicate, olive-green, fern-like species inhabits tidal pools along the coral reefs and rocky shores; a cosmopolitan species.

3. Pterocladia.

A small genus of two or three species, known only from warm parts of the Pacific; fronds repeatedly pinnatifid. *P. capillacea* (Gmel.) Bornet; uncommon; used by the natives of Kaua'i and Maui, and known by them as Limu loloa; occurs also in Mediterranean and Atlantic.

IV. GIGARTINACEAE.

A large cosmopolitan family of 18 genera, inhabiting all the oceans.

1. Gigartina.

A widely distributed genus of over sixty species; fronds fleshy gelatinous, variously ramified. *G. papillata* (Ag.) J. Ag.; frond flat, simple or sparingly dichotomous, segments truncate-cuneate; recorded only from Hawaiian Islands and the Golden Gate.

2. Gymnogongrus.

A widely distributed genus of over forty species; fronds fleshy-coriaceous or horny, terete or flat, repeatedly forked. *G. vermicularis americana* J. Ag.; a cosmopolitan species. *G. disciplinaris* (Bory) J. Ag.; recorded from various parts of the Pacific. These algae are generally called limu ua-ua-loli by the natives, but there are also a number of other local names: Limu ekaha-kaha, limu ko-ele-ele, limu awiki-wiki, limu nei. They grow far out on the coral reefs, along the outer margin where the surf is heavy. All have tough, strong holdfasts. They are most abundant on Maui and Moloka'i, and are rather scarce on Hawai'i.

Ahnfeltia.

A genus of five or more species, cosmopolitan in range; fronds fleshy, wiry, or horny, round, irregularly branched. *A. concinna* J. Ag.; native name limu aki-aki or limu eleau. A succulent, brittle, brownish-red alga, abundant on partially submerged lava rocks along the coasts. It shows a preference for exposed black lava rocks, in rough water, where it receives the heavy surf. It occurs in large

quantities in these habitats along the shores of Kaua'i, Oahu, and Hawai'i, and is plentiful here and there in a few localities on the other islands. Sometimes it grows in quiet coves or behind the lava rocks, in less exposed places. This seaweed is relished by the natives and is commonly sold in the markets. Its air-dry composition is, roughly,—water 20%, protein 5%, starches, sugars, etc., 55%, crude fiber 3%, ash 15%. In the fineness and clarity of its gelatine this alga is exceeded only by *Gracilaria coronopifolia*. *A. Durvillaei* (Bory) J. Ag.; recorded from various parts of the Pacific.

V. RHODOPHYLLIDACEAE.

A large cosmopolitan family of 23 or more genera.

1. *Eucheuma*.

A tropical and subtropical genus of about 15 species most of them occurring in the Indian Ocean; fronds fleshy-cartilaginous, pappillose. *E. nudum* J. Ag.; frond terete, subcompressed, dichotomously branched; recorded only from the North Pacific.

VI. SPHAEROCOCCACEAE.

A family characteristic of the warm and tropical oceans, but also occurring in other seas; about twenty genera.

1. *Sphaerococcus*.

A small genus in the warm parts of the Atlantic and Pacific Oceans; fronds membranous-cartilaginous, caespitose. *S. coronopifolius* (Good. & Wood) Ag.; fronds dichotomously branched; occurs in many parts of the Atlantic and Pacific.

2. *Gracilaria*.

A cosmopolitan genus of about fifty species, including many beautiful forms. *G. coronopifolia* J. Ag.; this species is called limu ma-nau-ea, and is extensively used for food by the Hawaiians. It grows in shallow water along the coral reefs, on sandy bottoms, and in stormy weather often drifts ashore in considerable quantities. It is plentiful along the low shallow beaches of leeward Kaua'i, Oahu, and Moloka'i. Because of the less favorable coasts, it is not abundant on Maui, and less so on Hawai'i. The season of greatest abundance is spring and early summer, altho it is fairly plentiful throughout the year. This is one of the limus commonly offered for sale in the native fishmarkets. Its air-dry composition is, roughly: 12% water, 8% protein, 58% starches, sugars, etc., 3% crude fiber, and 17% ash. Limu ma-nau-ea makes fine clear gelatine of excellent quality, and requires less cooking for its preparation than do the other algae. Reed states "Gracilaria coronopifolia is particularly rich in gelatin of the best quality suitable for food, and it also occurs in considerable quantities on all the islands but Hawai'i." *G. confervoides* (L.) Bory.; widely distributed in all oceans; fronds, long, terete, much branched.

3. *Hypnea*.

A genus of about 30 species, in all tropical and subtropical seas; fronds filiform, virgately-branched, with subulate branchlets. *H. nidiifica* J. Ag.; intricately caespitose, expanded; known only from the Pacific Ocean. *H. armata* (Mert.) J. Ag.; elongate, corymbiferously branched. These 'gae are known to the Hawaiians as limu hana

and are among the most commonly eaten of the Hawaiian seaweeds. They are especially relished when boiled with octopus. They grow along the coral reef in the shallow water, and often drift ashore in considerable quantities. *Hypnea* is very abundant on the sandy leeward shores of Oahu, Kaua'i, and Moloka'i; it is scarce on Maui, and very rare on Hawai'i. It is outranked by both *Gracilaria* and *Ahnfeltia* in the quality and quantity of its gelatine.

VII. RHODOMENIACEAE.

A large cosmopolitan family, with 17 genera.

1. *Plocamium*.

A large cosmopolitan genus of about thirty species; fronds membranous-cartilaginous, pinnately decomound; some very beautiful species. *P. Sandvicense* J. Ag.; known only from the Hawaiian Islands; leeward shores of Oahu.

2. *Champia*.

A genus of about ten species, widely dispersed in warm and tropical seas; fronds branched, tubular, nodose, purple, gelatinous, membranous. *C. compressa* Harv.; known to the Hawaiians as limu o-olu. It grows in shallow water along the coral reefs, both near the shore and further out in sandy places. It is not plentiful, however, and its distribution is very irregular. Also in South Pacific and African waters.

3. *Chylocladia*.

A genus of about ten species, in warm and tropical seas. *C. rigens* (Ag.) J. Ag.; according to Reed an edible species, called limu akuila or limu kihe by the Hawaiians; in many parts of the Atlantic and Pacific.

VIII. DELESSERIACEAE.

A large cosmopolitan family of twenty genera, many species inhabiting warm and tropical seas.

1. *Martensia*.

A genus of seven species, in tropical seas: fronds flat, dichotomous, with excentric subimbricate lobes. *M. flabelliformis* Harv.; plentiful in shallow waters along the coral reefs; also recorded from Samoa.

IX. BONNEMAISONIACEAE.

A family of six genera, inhabiting warm and tropical seas.

1. *Asparagopsis*.

A genus of three species, characteristic of tropical regions fronds penicillately branched, very fine and delicate. *A. Sanfordiana* Harv.; a very delicate plant, resembling a miniature pink conifer. It grows far out along the margins of the coral reefs, in shallow water where the surf breaks. It has a variety of Hawaiian names, limu kohu being the most common. On Maui, Moloka'i, and Kaua'i it is often called limu lipa-akai or limu lipahu. Reed makes the following statement concerning its use by the natives: "Limu kohu is always pounded well as it is being cleaned to free it from adhering bits of coral, and also so that it may be soaked more thoroughly to remove the disagreeable bitter flavor. It is soaked twenty-four hours or more in fresh water, to remove the bitter iodin flavor. It is then salted ready to be served as a relish or salad with meats,

fish, or poi, or it is mixed with other seaweeds and put into hot gravy and meat stews, just as many other limus are eaten. Limu kohu has a rather pleasant flavor, though it is slightly bitter even after soaking twenty-four hours. It is always found in the market made into balls about the size of a large baseball and heaped upon large plates. It sells at 25 cents per ball and is always in great demand."

Reed also describes an interesting cultivation of this alga by some of the natives: "The writer was much surprised to learn that a rude kind of cultivation of the much-prized limu kohu was practiced at Moloa'a, on Kaua'i. Here limu kohu grows very luxuriantly over the entire reef, and is the finest in color and flavor found on this group of islands. There is a small cove just beyond Moloa'a Bay to the northward, which is partly protected from the heavy trade winds and southerly storms by bold, rocky bluffs or headlands. The coral reef extends from the shore out perhaps half a mile and beyond the headlands, so that the whole cove has rather shallow water. The coral rock, the usual haunt of the limu kohu, is in this place somewhat protected from storms, so the natives can gather this limu almost any time of the year, at low tide, without danger from heavy breakers. The Hawaiians living at Moloa'a gather limu kohu for the Honolulu market regularly, making a nice little income from its sale, as they furnish the larger share of the supply. It is here that these limu gatherers have attempted to increase their sales by caring for their seaweed to the extent of weeding out all the other algae and thus no doubt, increasing the quality and quantity of limu kohu which here is so much finer and more luxuriant than any other place."

X. RHODOMELACEAE.

A very large cosmopolitan family of seventy or more genera.

1. Laurencia.

A large genus of nearly sixty species, very variable; mainly in tropical and subtropical seas. *L. nidifica* J. Ag.; reported only from the Hawaiian Islands. *L. papillosa* (Forst.) Grev.; widely distributed in all seas. *L. obtusa* (Huds.) Lamx.; widely distributed in all seas. *L. vaga* Kuett.; according to De Toni probably a form of *perforata*. *L. pinnatifida* (Gmel.) Lam. and var. *osmunda*. *L. perforata* Mont.; in the tropical Atlantic and Pacific. *L. virgata* (Ag.) J. Ag.; in Pacific and African waters.

These species are known to the Hawaiians by various names,—limu ma-neo-neo for the shorter, coarser species, limu li-peee-pee for the finer, longer forms. Limu lipee is a contracted word; limu li-puu-puu a name used locally in certain districts on Hawaii and Maui. The Laurencias grow in shallow water along the coral reefs, either on sandy bottom, or in rocky places. They are frequently washed ashore in considerable quantities by high tides or stormy weather. The Hawaiians use all the species for food, and the prepared limu may be purchased in the fish markets.

2. Chondria.

A genus of about 25 species, largely confined to warm oceans; our species also occurs in the Atlantic, Indian, and South Pacific. *C. tenuissima* var. *intermedia* Grun.; called limu o-olu by the natives, who used it for food. Abundant in the broad, shallow, sandy-bottomed shore waters of leeward Kaua'i, Oahu, and Moloka'i; easily

gathered. It prefers quiet water, and rarely grows in places exposed to the surf. Commonly offered for sale in the fish markets.

3. *Polysiphonia*.

A very large genus of perhaps 150 species, cosmopolitan in range. *P. Tongatensis* Harv.; according to De Toni probably a synonym for *mollis*. *P. polyphysa* Kuetz.; according to De Toni probably a synonym for *ferulacea*. *P. ferulacea* Suhr.; widely distributed in all oceans. *P. mollis* Hook & Harv.; called limu pu-alu or limu hawane by the natives; it is not popular, and is used by but few natives for food.

4. *Amansia*.

A genus of 8 or 10 species, in warm and tropical seas, fronds flat, erect, membranous, pinnately branched or highly ramified. *A. glomerata* Ag.; the beautiful dark red rosettes of this alga are to be found in deep shady holes and crevices in the coral reefs in moderately shallow water. This species is called limu li-pepe-iao or limu pepe-iao by the Hawaiians, who use it for food.

XI. CERAMIACEAE.

A very large family of forty or more genera, widely dispersed but most abundant in warm and tropical seas.

1. *Griffithsia*.

A genus of about 30 species, most abundant in tropical seas; fronds erect, filiform, branched, articulate; two kinds of branches. *G. ovalis* Harv.?; a very scarce species; used for food on Maui and southern Hawai'i; called limu moo-puna, limu ka-lipoa, and limu au-pupu.

2. *Ceramium*.

A large and widely distributed genus of at least 65 species; filaments branching, of a single row of cells, nodes with corticular bands. *C. clavulatum* Ag.; known by a variety of native names,—limu hulu-ilio, limu hulu, and limu hulu wawae-iolet. Abundant in shallow waters within the coral reefs, growing on the sandy bottom and on rocks; easily gathered. *C. Kuetzingianum* Grun.; fronds minute, thin, branched, epiphytic on other seaweeds; also occurs in the South Pacific.

XII. GRATELOUPIACEAE.

A family of 13 or more genera, characteristic of warm and tropical seas.

1. *Halymenia*.

A genus of 15-20 species, in warm and tropic seas. *H. formosa* Harv.; rare; native name limu pepe-ahina; fronds gelatinous, flat, stipitate, much branched; also in S. Pacific.

2. *Grateloupia*.

A genus of about forty species, widely dispersed in warm and tropical seas. *G. filicina* (Wulf.) Ag.; abundant in shallow water within the coral reef, on sandy bottom and on rocks. Known to the Hawaiians as limu paka-ele-awa'a or limu hulu-hulu-waena. The former name is used exclusively on Kaua'i, the latter on Hawai'i; both names are used on the intermediate islands. This alga also occurs in many other seas.

XIII. SQUAMARIACEAE.

A family of eight genera, occurring in all the oceans.

1. *Peyssonnelia*.

A genus of about 20 species, most abundant in warm and tropical seas; frond expanded horizontally, entire or margin variously torn; attached on the under surface, often crustaceous. *P. rubra* Decne.; in shallow water along the coral reefs, with such algae as *Halimeda opuntia*; adherent to the substratum; somewhat calcareous; in many other seas.

XIV. CORALLINACEAE.

A cosmopolitan family of nine genera, most abundant in warm oceans; rose-colored or purple, foliaceous or filiform, jointed, or articulated, calcareous.

1. *Mastophora*.

A genus of five species, confined to warm oceans. *M. tenuis*. Descne.; reported only from the Hawaiian Islands.

2. *Amphiroa*.

A genus of about thirty species, largely confined to warm seas. *A. fragillissima* (L.) Lamx.; collected at Laysan, also abundant in Indian Ocean, and along the shores of Peru.

3. *Corallina*.

A large genus of about 50 species, cosmopolitan in range, but mostly tropical; fronds erect, filiform, articulate, branches opposite. *C. Sandvicensis* Reinbold; collected at Laysan; fronds 4-5 cm. high; known only from Laysan.

RETROSPECT FOR 1917.

SUMMARIZED CONDITIONS.

ANOTHER period of review of Hawaii's progress devolves upon us, and looking back upon the leading events and activities of the year we are impressed with the strenuousness that has marked the spirit of the times. The year has been crowded with various weighty problems, not a few of them new experiences on account of the world war (as will be seen under the various subject headings following), all of which are being met and dealt with in a spirit of courageous patriotism.

Civic questions dealing with community life are problems that confront the public from time to time, which this year was fought vigorously, and it was hoped effectively, through legislative aid with a carefully prepared "Abatement Act",

but in this, right did not triumph, and hope is deferred. The movement led, however, to a new philanthropic effort which is proving its value.

Though an outpost far removed from the European carnage, yet Hawaii is, and has long been, an active participant by contributions for relief work and in volunteers, but more particularly since America's declaration of war with Germany, in April, have we realized its far-reaching effects. The soaring price of all commodities; the difficulties of securing long ordered supplies; the commandeering and withdrawal of the largest and best steamers, and restriction of freight are hardships to an isolated island community which is taxing the effort of our leading men to solve.

Prosperous conditions have attended our sugar and fruit industries, both in production and market realization for the year, which has insured a continuance of the commercial and building activities noted the preceding year. This has enabled Hawaii to share nobly in the financial calls upon her in the two Liberty loans, the Red Cross drive, and other war and philanthropic demands during the year. Registration throughout the territory for the war and the subsequent draft was carried out with remarkable smoothness, especially considering our cosmopolitanism.

WEATHER.

Following an average winter's rains, ending 1916, a heavy rain storm swept Oahu March 19th, doing damage throughout the island to roads and bridges estimated at \$75,000, and that of Honolulu at \$10,000. Rainfall for 24 hours at 8 a. m. of the 20th in the city, was 13.36 inches. Kauai shared in the storm somewhat, but not to any material damage. Apart from this, rains throughout the islands have been far below normal. Windward Hawaii and parts of Maui report experiencing a spell of drought the like of which has not occurred since 1897. In some sections fields of young cane have been sun-burnt dead, which, with other drought damage

on various plantations will tell seriously on the sugar crops for the next two years. Southern Hawaii had a rare hailstorm on two occasions in May.

POLITICAL.

According to law the territory is privileged to enjoy(?) perpetual political commotion through its annual elections, one year being for legislative honors and the next for County. This year it was the latter's turn to be served by primaries and general election campaigns. The primary election for City and County of Honolulu drew out some fifty self-sacrificing citizens for political slaughter, about half of whom were invited to stay home. At the final test, June 5th, to the surprise of many, former Mayor, Joseph Fern (Dem.), won back his position. Sheriff Rose and Auditor Bicknell were reelected over strong opposition. Of the Supervisors, Petrie, Hollinger and McClellan were returned again, the new members being E. A. Mott-Smith, Wm. Ahia, Chas. Arnold and Chas. Bellina.

Maui practically reelected their entire staff of officials, and Kauai made little change. Hawaii, however, was not so complaisant, but not all the changes aimed at were acceptable to the voters.

FINANCIAL CAMPAIGNS.

Never before in the history of these islands has Honolulu had such a year of campaigns as has assailed her citizens in this year of our Lord, 1917. First in importance is the Liberty loan, the first campaign, in June, securing \$4,857,850, a sum considerably over what had been estimated would be Hawaii's share, and the second, in October, securing \$8,060,800, again overrunning her allotment \$5,060,800. These figures cover all the islands, and include the subscriptions of the army in Hawaii, which was \$1,269,150. The Red Cross drive of September on this and the other islands was but an emphasis of what has been in progress for this worthy cause since the war in Europe began, and is being augmented by the

monthly subscriptions as paid in. Up to the end of October the War Relief and Red Cross fund forwarded had reached the sum of \$233,291.25. To this is to be added the Belgium relief fund, which has netted over \$10,000; the Joffre fund for orphans; Empire day campaign, as also the Red Cross (formerly War Relief) work, which has engaged the energies of noble women throughout the territory for many months, as is shown elsewhere in this issue.

The Y. W. C. A. carried through a \$17,000 campaign very successfully, for its better equipment, and a Waikiki beach adjunct.

The Y. M. C. A. launched a whirlwind campaign for funds for the purchase of the well-known Hawaiian Hotel property for an Army and Navy Y. M. C. A. headquarters, which called for a quarter million of dollars, toward which the International Army and Navy branch of the Y. M. C. A. of New York pledged \$75,000. The deal was carried through successfully and changes effected for its new purpose.

LEGISLATIVE.

The legislature for 1917 fulfilled legal requirements of convening and concluding its labors on time, but of the result, perhaps the least said the better, for the general feeling that prevailed was one of disappointment at the few good measures passed compared with the raft of questionable bills crowded into both houses throughout the session, a number of which became law. The good work of both houses may therefore be said to have been in saving us from many more like them by smothering them in committee, or tabling them at the ninth hour.

It is noticeable the low conception of moral ideas possessed by several members of the lower house in failing to support the senate in the abatement measure; lacking courage on the liquor question (as too many senators also were), and letting down the bars further for Sunday desecration.

A grave misconception of one's legislative duty was made apparent in the large number of bills presented already covered by the statutes, or recently rejected. One would-be wise-acre inflicted the session with no less than fifty-five bills, only one of which became law—a loss of time and useless waste of paper and printing, all of which was taxpayer's money. Another member's frequent bills and resolutions seemed based on the idea that his district had first claim on public lands and appropriations.

The great number of bills presented, assigned to the various committees, overwork conscientious chairmen, or give ground for clerical or other aid to important committees for the session, and at figures far in excess of those prevailing for like services in business circles. This same holds true in the pay of attending officers, messengers, janitors, etc. In this way the legislature is lending encouragement to graft within its own walls, where it should be the careful guardian of the public purse.

The session closed with 161 acts signed, and one passed over veto, at an expense of \$84,105.76, of which \$27,272.67 was from federal funds.

PUBLIC IMPROVEMENTS.

The most important project under this head under way is the concrete pier work, mentioned in last ANNUAL, which extends from Alakea street, pier No. 7, around the corner of the Esplanade to include the Oceanic wharf, pier No. 10. This work promises well for future needs of the port. It is not yet far enough along for the start of its planned concrete sheds.

Oahu prison, at Kalihi, is still in progress, delays in the arrival of material being largely responsible for its present incomplete status. The Insane asylum has been equipped with a therapeutic building and three additional cottages, which add materially to the efficiency of the institution for the care and comforts of its unfortunate inmates.

The moving of Davies & Co.'s three-story brick warehouse, on the Esplanade, contemplates the opening up of Bishop street to the water front. Street work is unceasing in its demands. At completion of Kalakaua avenue improvement, attention was given to Beretania street to the delight of autoists. Smith street has been cut through to Queen. Manoa road work is practically finished, as is also the Pali road, but beyond that little can be said.

Hilo breakwater is nearing completion of its second section, and work is begun on Kahului's new western arm, for the better protection of its port, for which \$250,000 was appropriated. The Inter-Island Co.'s coaling station is completed. A number of projects are in prospect which will be dealt with in due time.

HAWAII'S INTERNED FLEET.

Hawaii faced a new experience in February last as the strained relations between Germany and the United States were becoming tense, on finding that all the German refugee vessels in the harbor were being systematically damaged in their boilers and machinery. This concerted action had been in progress several days before suspicions gave place to tangible evidence of destructive activities transpiring on the gunboat *Geier*, and the large steamers *Holsatia*, *Setos*, *Pommern*, and *Prinz Waldemar* and others lying at their several piers, on the morning of the 5th, Sunday, when fire was discerned on the gunboat. The federal authorities then stepped in and took charge of affairs and placed a military guard around the piers. Prompt action saved the *Geier* from destruction at her dock. A number of men were placed under arrest, others were taken charge of by the immigration authorities, or interned at the army posts, and the various ships put under customs guard. Captain Grasshof surrendered his charge to Commander Hart of the submarine flotilla.

Everyone of the interned vessels, it was found, had been put out of commission, some seriously so. The damaged fleet,

and their tonnage, was as follows: Gunboat *Geier*; steamships *Pommern*, 4086; *Holsatia*, 3540; *Setos*, 3084; *Prinz Waldemar*, 1737; *Longmoon*, 1245; *Straatssekretar Kraetke*, 1208; *Gouverneur Jaeschke*, 1045, and schooner *Hermes*, 115. In addition was the steamship *O. J. D. Ahlers*, at Hilo, of 4736 tons, likewise internally injured. Later, on war being declared between the two nations, these interned ships became United States property and were repaired here, or towed to San Francisco to be rendered fit for service. The *Geier* as U. S. gunboat *Carl Schurz*, is at Pearl Harbor, the merchantmen, all under new names and flag, have found ready charterers and are sailing the seas.

CARNIVAL SEASON.

We have come to look upon the week in which Washington's birthday occurs as Carnival Season, the due observance of which demands much planning by men and women of experience and influence many months in advance. To the various committees and their faithful corps of co-workers in this behalf is due the success of our 1917 Carnival, which in most of its features was on a much larger and more elaborate scale than any of its predecessors, and the jovial spirit was manifest throughout the full week's events.

The islands were favored also with many more season's visitors than usual, all liners, including the big Hill steamships, for several trips being taxed to their capacity, and but for the war-cloud then darkening the horizon (which caused many timid folk to shorten their stay and hasten home), the record tourist season would have resulted better still.

The events in their daily order were as follows:

Monday, 19th. Pan-Pacific Pageant through the principal streets during the afternoon, comprising thirty-nine characteristic Hawaiian, and some fifty Pan-Pacific floats, all of which showed the master mind and hand of Alex. Hume Ford. In the evening was the Ball of All Nations at the Capitol grounds, at which the obnoxious hula was intruded.

Tuesday's events were interfered with by rain, save the "Night in Hawaii" in the evening at the Bijou theatre, comprising scenes, music and dances entirely Hawaiian in character and attraction.

Wednesday, 21st. Hawaiian Pageant at Kapiolani Park, postponed from the 20th at 3 p. m., enacting the romance of Iwikauiakaua, prince of Hawaii, illustrative of court life, sports and customs of a century ago. At noon the Hibiscus exhibit opened at the Pan-Pacific pavilion, Bishop street.

Thursday, 22nd. "The day we celebrate." At 9:30 a. m. Army parade through the main streets (credited as the largest held anywhere in the United States), with military review at the Capitol grounds. Swimming meet at the foot of Alakea street took place at 1:30, and in the evening the Japanese lantern parade through main streets, followed by a masked ball at the armory.

Friday, 23rd. Children's festival at Punahou grounds, opening at 1:30, of chorus singing by a thousand voices, interspersed with dances.

Saturday, 24th. Another swimming contest took place, winding up in the evening with a Water Pageant in the harbor of some fifty decorated and illuminated craft, and closing with an exhibition of fireworks.

Some former carnival features were missing this year, but the week was strenuous enough with the carrying out of the above program, to which must be added the very creditable exhibit of dioramas by local and visiting artists of a number of the most striking Hawaiian scenic views, which held a prominent place in the Pan-Pacific pavilion, opposite the Young Hotel, during and following the Hibiscus exhibit.

Aala Park blazed forth nightly with various allurements by money-making side-shows, not of the Carnival committee program, but seeking to profit by its public-spirited service.

REALTY CONDITIONS.

Among the more important land transactions has been the sale of the island of Lanai to F. F. and H. A. Baldwin for \$588,000, for a cattle ranch, and the Hawaiian Hotel property for an Army and Navy Y. M. C. A. at \$250,000; and the building will be remodeled to meet its new requirements at a cost of \$25,000.

The Hawaiian Electric Co. have secured two Esplanade lots adjoining them, for \$70,000, for the erection of an auxiliary power house; the Telephone Co. have bought from the Y. M. C. A. a frontage on Alakea St. for an extension of their present plant; the Edinburg property on Queen St. adjoining Hackfeld & Co. has changed hands at a good figure, as has also the Aldrich premises on Hotel St., said to be at \$75,000, and the Harrison property on Alakea St. next to Catton Neill's at \$30,000. On Kaahumanu St. a lot on which the last wooden building in the business center of the city stood (relic of early days), has been secured by the Bishop Estate for the erection of an office building.

Ainahau, once offered the territory for a memorial park, for its up-keep, has been sold and subdivided into residence lots which are finding ready buyers. Beach properties are attracting more and more attention each year and various tracts are being put on the market, subdivided for summer residence lots.

The real estate transfers for the past year ending Oct. 30th, show a very healthy tone, as there have been few foreclosures, only an average percentage of mortgages, and no serious fluctuations in values in any part of the territory. The volume of business has exceeded all previous years and was quite appreciably larger than last year, which up to that time, was the banner year, by a large margin.

Rates of interest are favorable to the home builder and indications all point to a continuance of heavy business in realty.

A point worthy of notice in registry affairs, is the steady, almost rapid, manner in which land titles are coming under the Land Court Act, commonly called the Torrens' Title system. Over one thousand certificates of title have been issued thus far, and many tracts of land are awaiting original registration.

BUILDING NOTES.

In spite of the higher cost of materials, the difficulty and delay in obtaining supplies, as also the heavy financial drain upon the community, there has been remarkable building activity during the year which has been general throughout the islands, and notably so in Hilo.

In Honolulu business section is to be noted a large new building in course of erection, corner of Fort and Hotel, to join the Campbell building, whose front is likewise being modernized to agree therewith. The store front changes just completed on the Brewer building, on the opposite side of Fort St., from the corner of Hotel to the Boston building, is a timely improvement to accord with the enlarged up-to-date store of Ehlers & Co. in the vicinity.

A large two-story concrete business block is going up at the corner of Nuuanu and King. Love's new two-story building on site of their old stand, Nuuanu St., is finished, as is also the fine Hotel St. addition to the Young Hotel. The two wing additions to the Moana Hotel, much delayed for needed supplies, is progressing toward completion. The same may be said of the sub-station of the Mutual Telephone Co., which they are erecting at Kalihi, and a large two-story concrete building at the corner of Richard and Hotel Sts. for the Royal Hawaiian Garage Co.

Residences are cropping up around the city rather than in it, T. A. Cooke, C. G. Boekus and F. B. Damon, Nuuanu; C. S. Judd, R. C. Brown, G. K. Larrison, Dr. A. N. Sinclair, Mr. Lightfoot, Geo. Kluegel, F. S. Midkiff, Dr. J. T. Wayson, Manoa; J. H. Lewis, J. M. Riggs, Mrs. E. Judd, Makiki

Heights, and C. W. C. Deering, Waikiki, being among the more prominent. The new parsonage of the Methodist church, Beretania St., built this year, harmonizes well with it, architecturally.

Places of worship have shared in the year's increase and improvement, notably: the Baldwin Memorial church, Paia, Maui, C. W. Dickey, architect, credited as the finest in the islands, was dedicated September 2nd; Hilo is erecting a new Catholic church, the St. Joseph's, to seat 800; E. A. Newcomb, its architect; at Laie, Oahu, a Mormon tabernacle is about finished, said to be a model of the famed Salt Lake structure. In this city the Christian Scientist church is building on Wilder avenue, corner of Kewalo St., to cost some \$60,000; the Kalihi Union church is completed, costing \$25,000; the Portuguese Protestant church has undergone enlargement, and the Kaluaaha (Molokai) church, one of the oldest in the islands, has been entirely renovated.

The Honwanji Buddhist Mission have erected a large temple on upper Fort St., which is now receiving its finishing touches awaiting its furnishings which will include an organ. The cost of the building is placed at \$70,000, and its equipment at \$30,000. A Buddhist temple of another sect, on Sheridan St., costing \$7,000, has recently been completed and dedicated.

A spacious two-story building is being erected at the corner of Fort and Vineyard, connected with the Japanese work of the Y. M. C. A. to cost \$30,275. The Salvation Army quarters in Manoa have completed their new building for their dependent young, and a Gospel Mission Home has been established in Palolo, by W. E. Pietsch, for fallen women, and for the care of children rescued from low tenements, a direct outcome of the anti-vice crusade.

LANDMARKS GONE.

In addition to the removal of old "Honolulu Hale", adjoining the post office, mentioned elsewhere, is the disap-

A point worthy of notice in registry affairs, is the steady, almost rapid, manner in which land titles are coming under the Land Court Act, commonly called the Torrens' Title system. Over one thousand certificates of title have been issued thus far, and many tracts of land are awaiting original registration.

BUILDING NOTES.

In spite of the higher cost of materials, the difficulty and delay in obtaining supplies, as also the heavy financial drain upon the community, there has been remarkable building activity during the year which has been general throughout the islands, and notably so in Hilo.

In Honolulu business section is to be noted a large new building in course of erection, corner of Fort and Hotel, to join the Campbell building, whose front is likewise being modernized to agree therewith. The store front changes just completed on the Brewer building, on the opposite side of Fort St., from the corner of Hotel to the Boston building, is a timely improvement to accord with the enlarged up-to-date store of Ehlers & Co. in the vicinity.

A large two-story concrete business block is going up at the corner of Nuuanu and King. Love's new two-story building on site of their old stand, Nuuanu St., is finished, as is also the fine Hotel St. addition to the Young Hotel. The two wing additions to the Moana Hotel, much delayed for needed supplies, is progressing toward completion. The same may be said of the sub-station of the Mutual Telephone Co., which they are erecting at Kalihi, and a large two-story concrete building at the corner of Richard and Hotel Sts. for the Royal Hawaiian Garage Co.

Residences are cropping up around the city rather than in it, T. A. Cooke, C. G. Bockus and F. B. Damon, Nuuanu; C. S. Judd, R. C. Brown, G. K. Larrison, Dr. A. N. Sinclair, Mr. Lightfoot, Geo. Kluegel, F. S. Midkiff, Dr. J. T. Wayson, Manoa; J. H. Lewis, J. M. Riggs, Mrs. E. Judd, Makiki

Heights, and C. W. C. Deering, Waikiki, being among the more prominent. The new parsonage of the Methodist church, Beretania St., built this year, harmonizes well with it, architecturally.

Places of worship have shared in the year's increase and improvement, notably: the Baldwin Memorial church, Paia, Maui, C. W. Dickey, architect, credited as the finest in the islands, was dedicated September 2nd; Hilo is erecting a new Catholic church, the St. Joseph's, to seat 800; E. A. Newcomb, its architect; at Laie, Oahu, a Mormon tabernacle is about finished, said to be a model of the famed Salt Lake structure. In this city the Christian Scientist church is building on Wilder avenue, corner of Kewalo St., to cost some \$60,000; the Kalihi Union church is completed, costing \$25,000; the Portuguese Protestant church has undergone enlargement, and the Kaluaaha (Molokai) church, one of the oldest in the islands, has been entirely renovated.

The Honwanji Buddhist Mission have erected a large temple on upper Fort St., which is now receiving its finishing touches awaiting its furnishings which will include an organ. The cost of the building is placed at \$70,000, and its equipment at \$30,000. A Buddhist temple of another sect, on Sheridan St., costing \$7,000, has recently been completed and dedicated.

A spacious two-story building is being erected at the corner of Fort and Vineyard, connected with the Japanese work of the Y. M. C. A. to cost \$30,275. The Salvation Army quarters in Manoa have completed their new building for their dependent young, and a Gospel Mission Home has been established in Palolo, by W. E. Pietsch, for fallen women, and for the care of children rescued from low tenements, a direct outcome of the anti-vice crusade.

LANDMARKS GONE.

In addition to the removal of old "Honolulu Hale", adjoining the post office, mentioned elsewhere, is the disap-

pearance of the last wooden structure in the business center of the city, the two-story building on Kaahumanu St., next to Schaefer & Co. This was originally the highest of Honolulu's buildings, a three-story structure, an importation in frame by Captain James Makee in 1850, and was erected by R. Coady & Co., ship chandlers and commission merchants, and for a time occupied by them. A. B. Howe, auctioneer and commission merchant, occupied the second floor about that same time. He was succeeded by Henry Sea. The lower story for several years was the auction room of John F. Colburn. The top floor was used many years by Captain J. M. Oat as a sail loft, and possibly others before him. The Chamber of Commerce used it awhile; public gatherings, and even theatricals occasionally held here. In 1873 the building was razed, the lower story being taken out and the structure lowered by jackscrews and refitted, since which time it has been largely used for offices and storage.

Mention is to be made also of the demolition of the Opera House, to make way for the long-talked-of Federal building. Its last use was an anti-vice mass meeting, March 4th, in support of the Abatement act before the legislature.

REGISTRATION AND DRAFT.

July 31st was Registration day throughout the territory, and the gathered accounts show Hawaii's patriotism while fulfilling the law, for but few slackers needed rounding up and proved an error of head and not of heart. By Counties the registration was as follows:

Oahu	citizens	4,714	aliens	7,608	total	12,322
Maui	"	1,048	"	2,631	"	3,679
Hawaii	"	1,605	"	5,542	"	7,147
Kauai	"	573	"	2,249	"	2,822
Totals.....	"	7,940	"	18,030	"	25,970

Draft day did not take place till November 1st, on which occasion the first quota for the selection of 300 each in the six districts of the islands were drawn, as Hawaii's first requisition.

KAMEHAMEHA DAY.

This year's observance of Hawaii's national holiday, June 11th, spent itself largely in elaborating on the annual parade of the native societies for the decorating of the Kamehameha statute, starting at 9 a. m. The literary exercises which followed were held in the Executive grounds, as usual. The English address was by Rev. A. Akana, and the Hawaiian by Rev. Wm. Kamau. Chas. E. King conducted the chorus singing of his societies.

An afternoon attraction, "The Festival of Pele," under the auspices of the Pan-Pacific Club, held forth on a section of the Ward•premises, King St., the apparent money scheme of which detracted from the merit of the project. The "sport of kings" and polo held sway at Kapiolani Park. An added feature of the Societies observance was the decoration of graves the day previous, Sunday.

MARINE CASUALTIES.

The I.-I. S. N. Co. have been unfortunate in steamer mis-haps since our last issue. The *Kilauea*, on passage from Hilo to Lahaina Dec. 12, 1916, cracked her shaft but made her port safely. Thence to Honolulu she was towed by the *Claudine*. During thick heavy weather the *Noeau* went on the rocks off Makalawaena Point, N. Kona, at 2 a. m. of March 20th, and became a total wreck in spite of strenuous rescue effort. May 20th the *Hamakua*, of 646 tons and 550 h.p., took fire shortly after passing Makena on her way to Hawaii, causing an explosion, and sank off the Maui coast. The chief officer and the boatswain were killed. Others of the steamer's complement of men, thirty-seven in all, reached Keoncio, Mani, by boats after an hour's rowing.

An unknown wreck on Jarvis Island, with no living person visible, was reported here July 22nd by the S.S. *Waimarino*, en route to San Francisco.

The motor auxiliary bark *R. P. Rithet*, from Mahukona, with a full cargo of sugar for San Francisco, burned at sea about July 23rd in long. 146.02 w. and lat. 31.43 n. The crew of sixteen headed for Kauai in an open boat and reached Port Allen in safety after a ten day's voyage.

October 30th, the captain, officers and crew, fourteen in all, of the four-masted schooner *Churchill*, of San Francisco, 600 tons, were brought to port by a Maui and Honolulu fishing party on the sampan *Makaiwa*, found in distress on French Frigate Shoals October 26th, the vessel having struck heavily on the reef at 9 p. m. the night before and was rapidly going to pieces. A boat with seven men had been sent in the darkness to land some supplies, expecting to return for others but was nowhere to be seen. On rescuing the captain and remainder of his men with much difficulty through high seas, the vessel caught fire and was left to her destruction. Search was then made for the missing boat, which was found during the afternoon buffetting the seas in a vain endeavor to effect a landing. All were timely rescued and brought to port. The ship was en route to Seattle from Nukualofa, Tonga, with copra.

SHIPPING MATTERS.

S.S. *Maui*, the new addition to the Matson line, and sister ship to the *Masonry*, was given an ovation on her arrival at this port, April 13th, followed by a ball in the evening to Captain Matson and officers at the Moana. The steamer touching at Kahului on the 15th, en route to Hilo, the planting and mercantile interests at that port did honor to their island's namesake. Our elation at the provision of a steamer fleet meeting present-day requirements was of but short duration, for all the largest and best of the Matson steamers, as also the Hill steamships, have been commandeered for transport service in the Atlantic. In their place the *President* and *Governor* of the Pacific Coast S. S. Co. are to be put on the run here, and permits granted the *Columbia* and *Ecuador* of

the Pacific Mail line to serve us en route to and from the Orient.

The Holland S.S. *Vondel*, first of the Netherland Royal Mail service from Amsterdam, via the canal and San Francisco, to the East Indies, arrived March 26th. Two other steamships of the new line followed later.

Fifteen of the crew of Norwegian stmr. *Thor*, which foundered in a storm some 850 miles to the northward of the islands, arrived here in an open boat, Dec. 1st, after fourteen days' hardship and exposure, under charge of the mate. Another boat load of fifteen, in charge of the captain, was rescued by a passing steamer Nov. 22nd, name not reported.

NEW ENTERPRISES.

Led doubtless by the growing interest in sport fishing fostered by the Tuna club, mentioned in last ANNUAL, and following investigations at the opening of the year by coast capitalists for the establishment of a fish cannery, the Macfarlane Tuna Canning Co. quietly entered the field with a \$5,000 plant, establishing their cannery near the Union Feed Co. on Ala Moana, and making its first export shipment in May. Since then the California-Hawaiian Canning Co. is shaping itself for business in this same line at the corner of First and Cooke Sts., Kakaako.

Maui has established a very successful Cement Plant at Paia, after several years' investigations and tests. The product meets all local requirements, comparing favorably with the imported article, and promises to materially affect future imports.

Kona's tobacco-growing effort is much encouraged by conditions this year. Favorable weather has produced a vigorous growth, with large leaves, insuring a good crop which, with the outlook of a steady and high-priced market, promise good returns.

HONOLULU WATER SUPPLY.

Every once in awhile the residents of Honolulu awaken to the seriousness of its inadequate water supply. Given a fair rainfall we worry along without saying much, but let a dry season befall us to diminish our springs, or lack of summer showers to keep lawns and foliage alive, we voice aloud the alarming situation of a steadily lessening water supply for the spreading city with its increasing population.

At the last outburst of indignation at the "do nothing" attitude of the powers that be, some three years ago, a committee was appointed to look into the water supply conditions and advise as to sources for securing an adequate increase. In the meantime work on the Hillebrand Glen spring to augment the city's supply has been entered upon, but is not yet of service. Nothing has been done by the City and County government with the Commission's exhaustive report which was completed and handed in last June. The present condition of Nuuanu water alarms those depending thereon, and calling for the consideration of the health authorities, adds to the seriousness of the situation.

Schofield Barracks does things differently. They have constructed a large reservoir at the foot of Kolekole Pass, Waianae range, to supply them with pure water pumped up from the Kaukonahua Gulch. A filtration plant is to be included in the system, the estimated expense of which will be about \$60,000.

PLANTATION NOTES.

Many important changes are in progress in a number of the larger plantation mills and boiling houses. The electrical plant equipment of several concerns are to benefit by the success attending the introduction of this agent in the Hawaiian Commercial Co.'s mill. Paia's substantial improvements in plant and buildings are credited as "many and up-to-date". Oahu Sugar Co.'s enlargement of plant has progressed steadily

during their grinding season, whereby its capacity is increased 60%. Its mills are two units of 14 rollers each. The plant, too, will electrify for the coming crop.

The Olao Sugar Co. has demonstrated the possibilities of bagasse for paper-making and has put in a plant for the manufacture of a special kind of paper for their own need, not for marketing. Doubtless this will lead to a new by-product industry, as outlined last year by R. Renton Hind.

Fire destroyed the boiling and engine houses of the Pepee-keo plantation, July 15th, the mill building narrowly escaping.

Drought has seriously affected the plantations of windward Hawaii and central Maui. In some sections lack of rain was experienced as early as February and has been the severest spell of drought in twenty years. This, while detrimental to this year's work, its seriousness is in the surely diminished crop of next year, estimated at one-sixth, and possibly affecting the year following.

Kukaiau Mill and Plantation have merged their interests and amalgamated with the Hamakua Mill Co. for the more economical possibilities in the management of the two properties, which adjoin; all grinding to be done by the Hamakua Mill.

Pioneer Mill Co.'s new Honokowai tunnel project to bring in a large body of water to their fields has been entered upon and is making good progress.

VOLCANO CHANGES.

Goddess Pele has been very gracious and attractive to the many visitors to her domain this year, and entrancing to the watchful scientists in their daily recording of her changeful moods. So far as known no year has presented such valuable opportunities to penetrate her secrets through volcanic study consequent upon these varying degrees of activity and at different elevations. Following a spell of subsidence in the early part of the year, the lava lake rose steadily in April and

became spectacular in its activity in May, and this activity, ever changing, has continued to the present writing, all of which has amply rewarded the greatly increased number of visitors during the year.

JOURNALISTIC ENTERPRISE.

The *Advertiser*, influenced doubtless by its republishing "Ellis' Tour of Hawaii", showed its enterprise by making a motor tour of all the islands, discovering and picturing the picturesque spots of each, the descriptive and illustrated account of which, beginning in March, and published as the touring party progressed, appeared as a full and complete illustrated record, by island, in their issue of June 30th, comprising 64 pages.

Whether by design or coincidence we know not, but the *Star-Bulletin* evinced its like enterprise, the same day, by their issue of a 56-page illustrated edition devoted to the building aspirations of the city, more particularly in the planned improvements in connection with the opening up of Bishop street.

Another journal's enterprise worthy of more than passing notice is the Christmas edition of the *Paradise of the Pacific* with its many illustrations of local scenes in colors. Especially fine is the full page plate showing sixteen varieties of hibiscus. In literary merit it is also meritorious and more varied in its hundred pages, and the press work maintains its usual standard.

IMPROVED STOCK IMPORTS.

Considerable fine-blooded stock has been imported this year for a number of ranches, as also private parties, among which are noted a selection of twenty head choice Holsteins to Robt. Hind, some of them prize winners at the S. F. Exposition dairy show; four blooded Duroc-Jersey pigs for breeding purposes to L. L. McCandless; a number of choice Ayreshires to Wm. H. Rice and H. P. Faye; eight fine bulls and two Holstein cows to Maui parties from Illinois; a number of blooded

colts to the Parker ranch; sixteen polo ponies from the Kittridge ranch to the Hawaii Polo and Racing club, and an importation of fine-blooded racing stock to Mrs. Walter Macfarlane.

A herd of choice selected milch cows comes to the Chas. Bellina ranch from California, for Honolulu, with promise of others to follow.

FIREs.

Events under this head have been fortunately fewer this year. An afternoon fire took possession of the Y. Ahin tenement and store building on King St. near Dowsett Lane, damaging the building and property of its tenants to the amount of probably \$5,000 before being brought under control by the active effort of the Fire Department, which saved the close-built vicinity from a spectacular conflagration.

A dwelling and entents, on School St., was destroyed by fire early in the morning of May 6th. Insured for \$1,500. On the 14th a cottage on Gulick avenue was badly damaged, loss estimated at about \$800. Five houses were destroyed Nov. 21st, in the congested Aala lane section, with loss of some \$3,000; partly insured.

At Watertown a bungalow school-house was completely destroyed, loss placed at \$1,200.

Maui has been less fortunate. Following the loss of a teacher's cottage by fire in November, was the destruction of the Lyceum Theater, four business houses and several cottages at Kahului, on the night of the 17th. The Theater loss is placed at \$10,000, on which but about \$2,000 insurance was carried.

FANATICAL.

Inspired, it is said, by a young girl's dream, in June last, a party of natives—men, women and children, twenty-six in all,—set out from the village of Hookena, Kona, bare-footed, to tramp the weary distance to the volcano, to offer themselves a sacrifice to Pele, lest the fire-goddess destroy all the islands but two, and on these but one human pair would be left as

progenitors of a new race. The journey proved too arduous as the party broke down from hunger and exposure, and were discovered by a stage driver who reported their plight to the police authorities of Kona who rescued the fanatics and took them to Waiohinu. Pele's catastrophe, which they hoped to avert, was to have occurred on Kamehameha day, June 11th.

CONGRESSIONAL VISITORS.

The territory is again honored by a Congressional visiting party, to acquaint themselves with the needs as well as the charms of Hawaii which are noised so much abroad these days. The party comprises five senators, eighteen representatives and several others, all of whom are learning Hawaii at first hand, including the usual land-woe tales, during their tour. They were welcomed officially on arrival; accorded a public reception at the Executive building and a ball at the armory in their honor. The visit to the volcano was startling and impressive, so much so as to promise aid in Prof. Jaggar's research work.

The death of the queen brought the party back to the city without visiting Maui as planned, which has given more opportunity for military and other Oahu investigations, and proving Kauai's attractions.

Among other distinguished visitors during the year was Rabindranath Tagore, Hindu poet, who, touching here January 23rd on his way home from the States, gave an afternoon address at the Young Hotel roof garden. Explorer Sir Ernest Shackleton, also at the same place, during the brief stop of his ship in port, April 3rd, told of his marvelous rescue work in the Antarctic.

MUSICAL TREATS.

The city has been visited again with a number of musicians of note during the year, whose concerts, with the aid of local artists have furnished enjoyable entertainments from time to time. Among these were Tina Lerner, Russian pianist, who gave two concerts in February in the Opera House; Katherine

Goodson, pianist, and Max Selinsky, Russian violinist, in three concerts, and Ellen Beach Yaw, famed coloratura singer, on two occasions at Mission Hall.

But the treat of the year that will last in memory for the sympathy, enjoyment and enthusiasm manifest, was the successful debut concerts of Miss Peggy Center, January 23rd and 26th, at the Opera House, with Madam Melba as accompanist to her protege. Honolulu felt proud of their daughter and grateful to Madam Melba in discovering and training her sweet young lyric and coloratura soprano voice.

RESIGNATIONS.

With the close of the year two long-tried and therefore proved valuable public servants resign from their respective positions, viz.: Rev. H. H. Parker, the faithful pastor for over fifty-four years of the Kawaiahao (native) church, and Dr. Wm. T. Brigham, director of the Bishop Museum, to which he has given the ripening years of his life with devotion and scientific ability that has built up the institution from its modest inception at his hands in 1889, to the foremost rank in its class in the world today, through the liberality of the late Chas. R. Bishop and the Museum Trustees.

NECROLOGY.

From among well-known or early residents, or identified with island interests, the following deaths have occurred since our last issue: Wm. G. Scott (49); H. S. Swinton (75), Mrs. Wm. T. Schmidt (42), A. A. Wilder (43), Mrs. E. C. Williams (70), Mrs. M. T. Morgan (49), Jas. Lycett (73), Miss A. M. Paris (73), Mrs. M. Hackfeld, Bremen (88), H. P. Wood (61), Mrs. S. B. Rose (68), F. M. Swanzey (67), W. P. Fennell, Cal. (57), Mrs. F. T. Bickerton (67), Cecil Brown (68), L. E. Thayer (74), Mrs. L. M. Dayton (72), Jas. Lyle, Cal. (83), Mrs. G. H. Gere (47), Mrs. Fred. Harrison (42), Mrs. M. B. McInerny (78), Mrs. J. H. Fisher (52), G. H. Gere (49), Miss K. S. Wight (53), Miss C. J. Armstrong, Cal. (70), Mrs. C. L. Paris, Cal. (80), Dr. F. A.

Lyman (54), C. E. Kellogg, Luther Severance (81), J. F. Haley (41), Levi T. Chamberlain (80), Mrs. R. W. Atkinson, N. Y. (29), N. P. Jacobson (74), Capt. Wm. Matson, Cal., Rev. W. E. Potwine, Cal., Queen Liliuokalani (79), Paul Muhlendorf (59), Wm. C. Parke (52).

NEW RADIO STATION.

Pearl Harbor Radio Station was formally opened September 28th by direct messages exchanged with Sayville, Long Island, without relay. The Secretary of the Navy in his congratulatory reply to Commandant Clark's message credits this as the most powerful radio station in the world.

ART EXHIBIT.

An exhibit by the Hawaiian Society of Artists, in which several visiting brethren cooperated, had its opening June 1st in the rooms of the Pan-Pacific Pavilion, which comprised oil and water colors, etchings and sculptures, an interesting and much-admired collection.

There have been several individual exhibits during the year, the islands being favored with visits of Lionel Walden, Ambrose Patterson, E. W. Christmas, R.B.A., Twigg-Smith, Chas. W. Bartlett, Harry Best and Alexr. Harrison.

MISCELLANEA.

The world war originating in Europe has caused the introduction of the copper cent into Honolulu as needed change for public convenience through the application November 1st of the war tax. The first shipment of 5,000 came to the bank of Bishop & Co. Since Annexation cents have been used in change at the post office, but not so as to become a popular coin.

Kapiolani Park is gradually taking on a "Zoo" feature, thanks to Supervisor Hollinger in his interest in animal attractions for the young. Beginning with an elephant on his hands, the rare animals and birds which he has procured from time to time, are proving both popular and educational.

Hilo Bay will soon have a flock of sea-gulls to welcome all visitors to the crescent city, Judge W. S. Wise having introduced several from San Francisco this past summer, which, in October, were reported as doing well.

A Fijian contingent 100 strong arrived here May 25th en route to the war zone and were entertained during their stay. In turn they paraded the principal streets and after lunch gave an exhibition of singing and dancing. A second company for this year passed through July 20th.

The daylight saving movement was agitated again this past summer, with evidence of material progress, but after due consideration before the chamber of commerce it failed in adoption.

Island inventive genius is said to have received government recognition by the acceptance of H. McCubbin's diver-destroying device upon a thorough test by the navy officials.

Anthrax broke out suddenly on Kauai early in summer, then in a herd of milch cows on Oahu and later among the cattle of Maui, inflicting serious loss in each case before it was got under control and eradicated.

MEANING OF SOME HAWAIIAN PLACE-NAMES.

THE following paper was contributed to the ANNUAL of 1901 by Prof. C. J. Lyons—acknowledged in his day as our foremost Hawaiian scholar—to meet the frequent inquiries for the definition of names of the different localities of Honolulu's vicinity. It is reproduced as being applicable to the same situation today.

It is not always safe to undertake to give the meaning of a Hawaiian proper name, especially for those not acquainted with the working of the Hawaiian mind, or what may be called the genius of the people. Some ludicrous mistakes have been made in this line. The literal translation of two words

taken separately may be very different from the idea conveyed to the Hawaiian mind by the combination.

Honolulu means the sheltered *hono*, *hono* being a hollow or valley with a bay or bight in front of it. Sheltered harbor, or quiet harbor, may be taken as the meaning.

Nuuau is "cool terrace" of notch in mountain, referring to the cold wind at the Pali, the place at the top of the Pali being a *nu'u* to those approaching from Koolau to the "*nuku o Nuuau*."

Pauoa is an "ear," or side valley to Nuuau.

Kalihi is the "outside edge," or boundary valley.

Manoa is the broad, or wide valley. *Palolo*, the clay valley; *palolo*, meaning clay.

Kaimuki is not the oven where food is cooked in *ki* leaves, but "the oven for cooking *ti* root." The root of the Dracaena is cooked and eaten like sugar cane—the juice also being distilled to liquor.

Leahi was originally "*Lae'ahi*," or "crest of the fish *ahi*," which this headland strongly resembles from the east. It has no allusion to *ahi*, fire, which is a different word.

Waikiki.—*kiki* is an old way of doing up the hair in a cone with lime or clay,—*wai* being water or stream.

Puowaina,—Punchbowl Hill, means "the hill of offering" or sacrifice,—*puu o waiho ana*, an antique form. The bodies of those slain for breaking tabu were laid on the altar-like ledge at the top and burned, the crack below giving a good draught of air.

Moanalua is named from the great expanse of level land and reef at the sea. *Kaholaloa*, Quarantine Island, broad coral reef.

Punahou; Hawaiian *Kapunahou*, is of course "new spring." *Kapalama*, a guarded enclosure. *Kamooiliili*, the pebbly or stony strip or ridge.

Two or three old idols in this line must be shattered by the strict antiquarian. Haleakala as "House of the sun" is a mod-

ern innovation; the original legend makes it mean the “ensnaring of the sun’s rays.” It would read *Hale o ka la* if it meant house of the sun—just as we say “Ka hale o Keawe,” “the house of Keawe.”

Halema’uma’u is not pronounced “mow-mow” but ma-u-ma-u, and cannot mean “house of everlasting fire.” It is somewhat doubtful too whether it means “Fern house;” so the etymology must probably be referred to the obscure past.

Kilauea too is an ancient name. It probably has reference to the rising, *ea*, of the cloud of smoke over the crater, as seen from a distance.

NEW LAVA TERMS.—T. A. Jaggar, Jr., of the Hawaiian Volcano Observatory, in order to meet the objections of English and continental geologists to the Hawaiian terms aa and pahoehoe for our two distinct kinds of lava, somewhat accepted by American geologists, proposes the adoption of the term Aphrolith (Greek, foam + stone) for the aa, and the term Dermolith (Greek, skin + stone) for the pahoehoe.

Interesting Phenomena, 1918.

Planetary Conjunctions, Angular Distance less than 1° , which will be visible in the Hawaiian Islands.

Date	Honolulu Mean Time	Bodies	Angular Distance
Apr. 12.....	12:41 A.M.	Mercury and Moon	$0^{\circ} 32'$
May 11.....	11:43 P.M.	Jupiter and Moon	0 57
June 8.....	8:13 P.M.	Jupiter and Moon	0 18
July 26.....	10:30 P.M.	Jupiter and Venus	0 36
Sept. 24.....	8:30 P.M.	Mercury and Venus	0 20
Dec. 3.....	9:55 A.M.	Venus and Moon	0 2

The last conjunction on the above list will be the only occultation of the year, which, despite its coming in the middle of the morning, may be witnessed in Hawaii, as both the Moon and Venus are visible in the daytime.

THE WOLF COMET.—Comet b 1916 (Wolf), passed its perihelion June 16, 1917. It is rapidly receding from the Sun and the Earth, and will pass out beyond the orbit of Jupiter about September, 1918. At the beginning of this year it will be traveling almost due East, through the constellation of Cetus, southeast of the Square of Pegasus. Its magnitude will be less than 12th Magnitude, rapidly becoming fainter.

List of Sugar Plantations, Mills and Cane Growers Throughout the Islands.

Those marked with an asterisk (*) are planters only; those marked with a dagger (†) are mills only; all others are plantations complete, owning their own mills. (Corrected to November 1, 1917.)

Name.	Location.	Manager.	Agents.
Apokaa Sugar Co.*	Ewa, Oahu	G. F. Renton	Castle & Cooke, Ltd.
Ewa Plantation	Ewa, Oahu	G. F. Renton	Castle & Cooke, Ltd.
Gay & Robinson	Makaweli, Kauai	S. Robinson	H. Waterhouse Trust Co., Ltd.
Grove Farm*	Nawiliwili, Kauai	Edwin Broadbent	H. Hackfeld & Co., Ltd.
Hakalau Plantation Co.	Hilo, Hawaii	J. M. Ross	C. Brewer & Co., Ltd.
Hawaiia Sugar Co.	Kohala, Hawaii	H. H. Perry	T. H. Davies & Co., Ltd.
Hamakua Mill Co.	Hamakua, Hawaii	A. Liggrate	T. H. Davies & Co., Ltd.
Hawi Mill and Plantation Co.	Kohala, Hawaii	John Hind	Hind, Rolph & Co.
Hawaiian Agricultural Co.	Kau, Hawaii	Jas. Campsie	C. Brewer & Co., Ltd.
Hawaiian Commercial & Sugar Co.	Punene, Maui	F. F. Baldwin	Alexander & Baldwin, Ltd.
Hawaiian Sugar Co.	Makaweli, Kauai	B. D. Baldwin	Alexander & Baldwin, Ltd.
Hawaii Mill Co.†	Hilo, Hawaii	Jas. Henderson	C. Brewer & Co., Ltd. ¹
Hilo Sugar Co.	Hilo, Hawaii	John A. Scott	C. Brewer & Co., Ltd.
Honolulu Plantation Co.	Hawaia, Oahu	Jas. Gibb	C. Brewer & Co., Ltd.
Honokaa Sugar Co.	Honokaa, Hawaii	W. P. Naquin	F. A. Schaefer & Co., Ltd.
Honomu Sugar Co.	Hilo, Hawaii	Wm. Pullar	C. Brewer & Co., Ltd.
Hutchinson Sugar Plantation Co.	Kau, Hawaii	Geo. Gibb	C. Brewer & Co., Ltd.
Kaeleku Sugar Co.	Hana, Maui	J. Chalmers	T. H. Davies & Co., Ltd.
Kahuku Plantation	Kanuku, Oahu	Andrew Adams	Alexander & Baldwin, Ltd.
Kaiwaki Sugar Co.	Ookala, Hawaii	Jas. Johnston	T. H. Davies & Co., Ltd.
Kaiwaki Milling Co.†	Hilo, Hawaii	Fred. L. Wadron, Ltd. ²	H. Hackfeld & Co., Ltd.
Kekaha Sugar Co.	Kekaha, Kauai	H. P. Faye	H. Hackfeld & Co., Ltd.
Kilauea Sugar Plantation Co.	Kilauea, Kauai	J. R. Myers	C. Brewer & Co., Ltd.
Kipahulu Sugar Co.	Kipahulu, Maui	J. Fassoth	H. Hackfeld & Co., Ltd.
Kohala Sugar Co.	Kohala, Hawaii	Geo. C. Watt	Castle & Cooke, Ltd.

¹ Shipping agents.

² Selling agents.

Name.	Location.	Manager.	Agents.
Koloa Sugar Co.	Koloa, Kauai	E. Cropp	H. Hackfeld & Co., Ltd.
Kona Development Co.	Kona, Hawaii	T. Konna	H. Waterhouse Trust Co., Ltd.
Koolau Agricultural Co.*	Koolau, Oahu	Andrew Adams	Hawaiian Development Co.
Lai'e Plantation	Lai'e, Oahu	S. E. Wooley	Alexander & Baldwin, Ltd.
Laupahoehoe Sugar Co.	Laupahoehoe, Haw	R. Hutchinson	T. H. Davies & Co., Ltd.
Lihue Plantation Co.	Lihue, Kauai	F. Weber	H. Hackfeld & Co., Ltd.
Makee Sugar Co.	Kealia, Kauai	H. Wolters	H. Hackfeld & Co., Ltd.
Maui Agricultural Co.	Haiku, etc., Maui	H. A. Baldwin	Alexander & Baldwin, Ltd.
McBryde Sugar Co.	Wahawa, Kauai	F. A. Alexander	Alexander & Baldwin, Ltd.
Niulii Mill & Plantation	Kohala, Hawaii	Robert Hall	T. H. Davies & Co., Ltd.
Oahu Sugar Co.	Waipahu, Oahu	E. K. Bull	H. Hackfeld & Co., Ltd.
Olaa Sugar Co.	Olaa, Hawaii	C. F. Eckart	Bishop & Co.
Olowalu Sugar Co.	Hilo, Hawaii	Alex. Valentine	C. Brewer & Co., Ltd.
Onomea Sugar Co.	Hamakua, Hawaii	John T. Moir	C. Brewer & Co., Ltd.
Paauhau Sugar Plantation Co.*	Kukuihaele, Hawaii	F. M. Anderson	C. Brewer & Co., Ltd.
Pacific Sugar Mill (†)	Hilo, Hawaii	W. P. Naquin	F. A. Schaefer & Co., Ltd.
Pepeekeo Sugar Co.	Lahaaina, Maui	Jas. Webster	C. Brewer & Co., Ltd.
Pioneer Mill Co., Ltd.	Kohala, Hawaii	L. Weinheimer	H. Hackfeld & Co., Ltd.
Puakea Plantation Co.	Kohala, Hawaii	H. R. Bryant	H. Waterhouse Trust Co., Ltd.
Union Mill Co.	Hilo, Hawaii	H. H. Renton	T. H. Davies & Co., Ltd.
Waialaea Mill Co.	Waialua, Oahu	D. Forbes	T. H. Davies & Co., Ltd.
Waialua Agricultural Co.	Waianae, Oahu	W. W. Goodale	Castle & Cooke, Ltd.
Waianae Plantation	Waialuku, Maui	Fred. Meyer	J. M. Dowsett
Wailuku Sugar Co.	Waimanalo, Oahu	H. B. Penhallow	C. Brewer & Co., Ltd.
Waimanalo Sugar Co.	Waimea, Kauai	Geo. Chalmers	C. Brewer & Co., Ltd.
Waimea Sugar Mill Co.	G. R. Ewart, Jr	G. R. Ewart	H. Hackfeld & Co., Ltd.

HAWAIIAN SUGAR CROPS, IN TONS, 1912-17.

From Tables Prepared for Hawaiian Planters' Association by its Bureau of Labor and Statistics.

Prior years of this table, originating in 1891, will be found in Annuals since 1901.

Islands.	1912	1913	1914	1915	1916	1917
Production of Hawaii	209,920	197,415	217,654	240,785	197,654	232,132
" " Maui	248,585	124,819	144,940	160,283	150,312	147,648
" " Oahu	139,712	124,228	133,560	129,997	136,966	145,550
" " Kauai	97,041	100,336	120,884	115,380	108,551	119,244
Grand Total....	595,258	546,798	617,038	646,445	593,483	644,574
Hawaii Plantations.						
Waiakea Mill Co....	14,332	13,076	14,922	16,141	14,484	14,876
Hawaii Mill Co.....	2,378	2,855	3,601	3,793	1,845	3,653
Hilo Sugar Co.....	13,872	14,033	18,937	17,905	16,450	16,150
Onomea Sugar Co....	17,454	16,887	19,600	21,320	18,732	21,067
Pepeekeo Sugar Co..	8,009	8,951	9,806	11,948	9,345	11,040
Honomu Sugar Co....	7,450	7,004	8,567	9,852	6,557	9,576
Hakalau Plant. Co....	17,116	15,402	16,863	19,327	15,951	20,235
Laupahoehoe Sgr. Co.	9,087	9,671	11,193	11,730	10,174	11,302
Kaiwiki Sugar Co....	5,896	5,140	6,932	6,849	5,013	7,191
Kukaiau Plant. Co....	2,021	2,078)			
Kukaiau Mill Co....	1,347	1,385	3,225	4,672	3,118	5,056
Hamakua Mill Co....	9,461	6,845	7,057	9,261	7,661	9,926
Paauhau S. Plant. Co.	11,391	9,958	10,767	10,073	7,859	10,868
Honokaa Sugar Co....	8,259	10,103	7,272	8,613	7,232	9,031
Pacific Sugar Mill...	7,001	5,938	6,250	7,253	5,656	7,970
Niulii Mill and Plant.	2,014	2,803	2,700	3,098	2,110	2,556
Halawa Plantation...	1,902	1,641	2,087	2,840	1,705	2,559
Kohala Sugar Co....	5,970	5,675	4,475	7,780	4,170	6,427
Union Mill Co.....	3,990	1,769	2,608	3,437	1,966	2,392
Hawi Mill and Plant..	9,453	6,489	6,745	9,426	6,461	9,045
Kona Developm't Co.	2,570	2,943	3,477	3,444	144	4,555
Hutchinson S. Pl. Co.	8,002	5,510	5,909	6,781	9,723	6,647
Hawaiian Agrl. Co....	14,938	12,856	17,890	16,407	13,818	12,385
Puakea Plantation....	1,538	839	1,035	1,429	963	937
Olaa Sugar Co.....	22,941	27,399	25,736	27,406	26,476	26,698
Puako Plantation....	519	185	.....	.....	.....	.....
	209,920	197,415	217,654	240,785	197,654	232,132

HAWAIIAN SUGAR CROPS, 1912-17—Continued.

Maui Plantations.	1912	1913	1914	1915	1916	1917
Kipahulu Sugar Co..	2,197	1,408	2,126	2,699	848	1,510
Kaeleku Plant. Co.*..	4,949	4,938	6,225	6,605	6,721	6,240
Maui Agri. Co.....	34,612	24,633	33,660	39,620	34,011	35,795
Hawn. Coml. & S. Co.	60,010	50,310	56,500	56,780	59,035	53,812
Wailuku Sugar Co... .	16,775	13,988	16,100	19,177	15,094	15,038
Olowalu Co.	1,707	1,738	2,027	2,173	1,850	1,974
Pioneer Mill Co., Ltd.	28,335	27,804	28,302	33,229	32,753	33,279
	148,585	124,819	144,940	160,283	150,312	147,648
Oahu Plantations.						
Waianalo Sgr. Co..	4,979	4,287	5,133	5,260	5,018	4,953
Laie Plantation	1,200	977	1,600	1,171	1,541	1,178
Kahuku Plant. Co....	6,024	6,215	8,193	7,823	6,534	8,317
Waialua Agrl. Co....	33,356	29,751	30,298	31,156	31,227	29,941
Waianae Co.	6,021	5,226	0,083	6,400	4,626	6,115
Ewa Plantation Co... .	34,435	29,512	29,563	29,502	32,045	34,748
Apokaa Sugar Co.....	895	381	925	356	793	939
Oahu Sugar Co.....	33,472	28,142	33,474	29,619	33,625	37,211
Honolulu Plant. Co..	18,692	19,337	20,154	18,233	20,586	21,562
Koolau Agrl. Co.....	638	400	1,137	487	971	586
	139,712	124,228	133,560	129,997	136,996	145,550
Kauai Plantations.						
Kilauea S. Plant. Co.	5,543	5,451	6,426	6,733	5,216	5,924
Makee Sugar Co.....	5,219	7,418	10,660	10,944	5,138	13,509
Lihue Plantation Co.	18,021	19,819	22,065	21,492	20,168	20,174
Grove Farm Plntn...	3,098	3,695	4,415	4,007	3,569	3,836
Koloa Sugar Co.....	8,005	5,886	8,572	9,502	7,955	9,206
McBryde Sugar Co... .	13,147	14,509	16,345	15,458	15,598	17,407
Hawaiian Sugar Co..	22,221	22,308	26,826	24,706	23,194	23,534
Gay & Robinson.....	4,659	4,821	5,172	5,259	4,650	4,510
Waimea Sgr. Mill Co.	1,922	1,610	2,258	1,404	2,054	1,965
Kekaha Sugar Co.... .	14,348	14,008	17,153	15,078	16,107	18,354
Estate of V. Knudsen	858	811	992	795	902	825
Total.....	97,041	100,336	120,884	115,380	108,551	119,244

* Formerly Hana Plantation.

TERRITORIAL REGISTER AND DIRECTORY FOR 1918.

Corrected to December 1, 1917.

TERRITORIAL OFFICIALS.

Lucius E. Pinkham.....	Governor
C. P. Iaukea.....	Secretary
I. M. Stainback.....	Attorney General
C. J. McCarthy.....	Treasurer
C. R. Forbes.....	Supt. Public Works
B. G. Rivenburgh.....	Comr. Pub. Lands
H. W. Kinney..	Supt. Public Instruction
Manley K. Hopkins.....	Auditor
W. P. Jarrett.....	High Sheriff
Will Wayne.....	Secretary to Governor

Jonah K. Kalanianaole.....	Delegate to Congress
----------------------------	----------------------

LEGISLATIVE BODY.

SENATORS.

Hawaii—G. P. Kamauoha, R. H. Makakau, S. L. Desha,	Robt. Hind.
Maui—H. A. Baldwin, Geo. P. Cooke, W. T. Robinson.	
Oahu—A. L. Castle, C. F. Chillingworth, S. P. Correa, M. C. Pacheco, E. W. Quinn, R. W. Shingle.	
Kauai—J. H. Coney, M. A. Mikaele.	

REPRESENTATIVES.

Hawaii—H. L. Holstein, E. K. Kaaua, G. K. Kawaha, H. L. Kawehewi, B. H. Kelekolio, Jno. Leal, N. K. Lyman, E. da Silva.	
Maui—Jno. Brown, Jr., L. I. Joseph, M. G. Paschoal, A. F. Tavares, Ed. Waiaho, J. J. Walsh.	
Oahu—Robt. Ahuna, Lorrin Andrews, C. H. Cooke, E. K. Fernandez, Jas. K. Jarrett, Jos. Kalana, D. M. Kupihea, C. N. Marquez, Wm. E. Miles, W. F. Mossman, T. H. Petrie, G. P. Wilder.	
Kauai—J. de C. Jerves, Jas. K. Kula, Jas. K. Lota, Chas. H. Wilcox.	

NATIONAL GUARD OF HAWAII.

Lucius E. Pinkham.....	Commander in Chief
...Governor and Commander in Chief	

Department Staff.

Brig.-Gen. Saml. I. Johnson.....	
.....Chief of Staff., Adj't.-Gen.	
W. Wayne.....	Asst. to Adj't.-Gen.
Maj. I. M. Stainback.....	Judge Adv. Gen.
Maj. Jno. W. Short.....	Q. M. Gen.

Lt.-Col. Chas. B. Cooper.....	Med. Corps
Maj. J. M. Camara.....	Ordn. Dept.

Additional Staff.

Maj. Jas. D. Dougherty, Q. M. C.....	
.....Aide-de-Camp to the Governor	
Capt. Henry Van Gieson.....	Q.M.C.
Capt. Leopold G. Blackman.....	Q.M.C.
Capt. Charles R. Bostwick.....	Q.M.C.

1st Lt. W. Lam.....	Dental Corps
---------------------	--------------

Department of Judiciary.

SUPREME COURT.

Chief Justice.....	Hon. A. G. M. Robertson
Associate Justice.....	Hon. J. L. Coke
Associate Justice.....	Hon. R. P. Quarles

CIRCUIT COURTS.

First Judge 1st Circuit, Oahu.....	Hon. C. W. Ashford
Second Judge 1st Circuit, Oahu.....	Hon. S. B. Kemp
Third Judge 1st Circuit, Oahu.....	Hon. Wm. H. Heen
Second Circuit, Maui.....	Hon. W. S. Edings
Third Circuit, Hawaii.....	Hon. Jas. W. Thompson
Fourth Circuit, Hawaii.....	Hon. Clement K. Quinn
Fifth Circuit, Kauai.....	Hon. Lyle A. Dickey

CLERKS OF COURTS.

Clerk Supreme Court.....	J. A. Thompson
Asst. Clerk, Supreme Court.....	Robt. Parker, Jr.
Stenographer, Supreme Court.....	Miss Kate Kelly
Bailiff and Librarian Supreme Court.....	Jesse Ululii
Copyists.....	Edith Mossman, Elizabeth Haile

Circuit Court, First Circuit.

Chief Clerk and Cashier.....	Henry Smith
Assistant Clerks.....	
.....B. N. Kahalepuna, Sibyl Davis	
Clerks, 1st Judge.....	
.....H. A. Wilder, J. Cullen	
Clerks, 2d Judge.....	
.....A. V. Hogan, A. E. Restarick	
Clerks, 3rd Judge.....	
.....Claus Roberts, Eva A. Robinson	
Stenographers.....	J. L. Horner, H. R. Jordan, O. P. Soares
Clerk, Second Circuit, Maui.....	
.....V. C. Schoenberg	
Clerk, Third Circuit, Hawaii.....	
.....John Hills	

Clerks, Fourth Circuit, Hawaii.....	
.....Thos. J. Ryan, Thomas Pedro	
Clerk Fifth Circuit, Kauai.....	D. Wm. Dean

COURT INTERPRETERS.

Hawaiian.....	C. L. Hopkins
Japanese.....	Chester A. Doyle
Chinese.....	Say Kau Lan

DISTRICT MAGISTRATES.

Oahu.	
Harry Irwin	Honolulu
Alexr. D. Larnach, Second.....	Honolulu
S. Hookano.....	Ewa
B. P. Zablan.....	Waianae
L. B. Nainoa.....	Koolau
E. Hore	Waialua
Wm. S. Wond, Second.....	Waialua
E. P. Aikue.....	Koolaupoko
Henry Cobb Adams, Second.....	Koolaupoko

Maui.

W. A. McKay.....	Wailuku
Philip Pali.....	Lahaina
Jos. G. Anjo.....	Makawao
G. K. Kunukau.....	Second, Makawao
H. E. Palakiko.....	Hana
G. P. Kauimakaole.....	Second, Hana
C. C. Conradt.....	Molokai
Jos. E. Conradt.....	Kalawao
J. D. McVeigh.....	Second Kalawao

Hawaii.

Delbert E. Metzger.....	South Hilo
W. H. Smith, Second.....	South Hilo
T. E. M. Osorio.....	North Hilo
R. H. Atkins.....	North Kohala
Thos. N. Naleelelehua.....	South Kohala
Henry Hall.....	Hamakua
M. S. Botelho, Second.....	Hamakua
Jos. S. Ferry.....	Puna
S. H. Haaheo, Second.....	Puna
Walter H. Hayselden.....	Kau
David K. Baker.....	North Kona
Robt. Makahalupa.....	South Kona

Kauai.

J. L. Hjorth.....	Lihue
Jas. H. K. Kaiwi, Second.....	Lihue
D. K. Kapahee.....	Koloa
S. K. Kaulili, Second.....	Koloa
Wm. Huddy.....	Hanalei
C. B. Hofgaard.....	Waimea
J. K. Kapuniai.....	Waimea
R. Puuki.....	Kawaihau

DEPARTMENT OF SECRETARY.

Secretary.....	C. P. Iaukea
Chief Clerk of Dept.	Eben Cushingham
I. Sterling, R. S. Lono.....	Clerks

FOREIGN REPRESENTATIVES.

Portugal—Consul General.....	
Italy—Consul (acting)....	Senhor A. Cunha Pessoa
Austria-Hungary—Consul.....	E. L. S. Gordon
Netherlands.....	Luis Guillen Gil, in charge
Norway—Consul.....	H. M. von Holt
Denmark.....	L. M. Vetlesen
" (acting).....	C. J. Hedemann
Germany.....	Luis Guillen Gil, in charge
Mexico—Consul.....	W. Lanz
Peru.....	Bruce Cartwright, Jr.
Chili—Consul.....	J. W. Waldron
" (acting).....	W. Lanz
Great Britain—Consul.....	E. L. S. Gordon
Belgium—Vice-Consul.....	A. Marques
Sweden—Consul.....	Luis Guillen Gil, in charge

Spain—Consul.....	Luis Guillen Gil
Spain—Vice-Consul.....	T. F. Sedgwick
France—Consul.....	A. Marques
Japan—Consul-General.....	Rokuro Moroi
China—Consul.....	Tsz-Ang Woohuan
Panama—Consul.....	A. Marques
Russia—Vice-Consul.....	A. Marques
Panama—Consul, Hilo.....	R. T. Guard
Brazil.....	A. D. Castro

DEPARTMENT OF ATTORNEY GENERAL.

Attorney-General.....	I. M. Stainback
1st Deputy Atty.-General.....	A. G. Smith
2nd Deputy Atty.-General.....	
Clerk of Dept.....	Cornell S. Franklin
Stenographer.....	Irmgard L. Brash
High Sheriff.....	Wm. P. Jarrett

BOARD OF PRISON INSPECTORS.

Oahu—J. W. Waldron, J. M. Dowsett,
E. H. Wodehouse.
Maui—Wm. Henning, G. Freeland, J. Garcia.
W. Hawaii—Samuel P. Woods, Julian Monsarrat, Luther S. Aungst.
E. Hawaii—W. Weight, C. E. Wright, Geo. Cool.
Kauai—A. S. Wilcox, J. M. Lydgate, H. Wolters.

TREASURY DEPARTMENT.

Treasurer.....	C. J. McCarthy
Registrar of Public Accts..	H. C. Hapai
Dep. Reg. and Bookkeeper..	T. Treadway
Dep. Bank Examiner..	W. H. Drummond
Stenographer and Typewriter.....	Edith Jordan
Clerks.....	Saml. Kekumano, S. H. Kahalewai

BUREAU OF CONVEYANCES.

Registrar of Conveyances.....	C. H. Merriam
Deputy Registrar.....	Geo. C. Kopa

ASSESSORS AND COLLECTORS.

First Division, Oahu.

Chas. T. Wilder.....	Assessor
A. W. Neely.....	Deputy 1st Division
P. J. Jarrett, H. Sing Fook, V. Fernandez, I. H. Harbottle, R. G. Ross, Ti Mito, John A. Palmer, Chas. Girdier, R. B. Reedy, A. A. Dunn, Deputies Honolulu:	
F. H. H'ay selden.....	Ewa and Waianae
F. W. Hol'.....	Waialua
Henry Cobb Adams.....	
".....	Koolau and Koolaupoko

Second Division, Maui.

J. H. Kunewa.....	Assessor
W. E. Cockett.....	Wailuku
J. M. Ambrose.....	Lahaina
W. Henning.....	Makawao
W. H. Cooper.....	Hana
J. M. Ambrose.....	Molokai and Lanai

Third Division, Hawaii.

O. T. Shipman.....	Assessor
D. W. Branco.....	North Hilo
G. D. Supe.....	South Hilo
Geo. Mundon.....	Puna
W. H. Lainaholo.....	Kau
W. D. Ackerman.....	Kona
S. P. Woods.....	North Kohala
Moses Koki.....	South Kohala
Robt. Gillespie.....	Makakua

Fourth Division, Kauai.

J. K. Farley.....	Assessor
W. K. Waiwaiole.....	Koloa
J. K. Kapunial.....	Waimea
L. D. Timmons.....	Lihue
L. B. Boreiko.....	Hanalei
M. R. Teves.....	Kawaihau

AUDITING DEPARTMENT.

Auditor.....	Manley G. K. Hopkins
Deputy Auditor.....	G. W. R. King
Clerks.....	A. May, Jno. W. Vannatta L. Lono.

DEPARTMENT OF PUBLIC WORKS.

Superintendent.....	C. R. Forbes
Acting Supt.....	W. R. Hobby
Chief Clerk of Dept.....	Manuel K. Cook
Clerk.....	B. K. Ka-ne
Stenographers.....	Mrs. M. G. Schmidt, A. Wicke

Engineers	A. C. Wheeler, A. L. Burdick
-----------------	------------------------------

Harbor Master, Honolulu.....	Capt. W. R. Foster
Assistant.....	Capt. Wm. H. Curtis
Pilots, Honolulu—Capts. M. A. Madsen, J. R. Macaulay, J. F. Haglund.	

Harbor Master and Pilot, Hilo.....	Capt. F. Mosher
Pilot, Kahului.....	Capt. E. H. Parker

" Port Allen.. Capt. Geo. B. Leavitt

BOARD OF HARBOR COMMISSIONERS

Chairman (ex-officio).....	C. R. Forbes
Secretary	Norman Watkins
Jas. Wakefield, W. H. McClellan, C. J. McCarthy.	
Frank C. Poor.....	Clerk
Assistant Clerk and Stenographer.....	Miss Cecile Fahey
Asistant Clerk.....	Mrs. P. W. Purdy

GOVERNMENT SURVEYING CORPS.

Walter E. Wall.....	Surveyor
Herbert E. Newton.....	Office Assistant
F. Wm. Thrum, Thos. J. K. Evans.Asts.	
Jos. Iao	Draughtsman
Miss A. F. Bertleman.....	Stenographer

BOARD OF COMMISSIONERS OF AGRICULTURE AND FORESTRY.

Commissioners — A. H. Rice, President; H. M. von Holt, W. M. Giffard, J. M. Dowsett, A. L. C. Atkinson.	
---	--

Division of Forestry.

C. S. Judd—Supt. Forestry and Executive Officer of Board.	
David Haughs.....	Forest Nurseryman
Joseph F. Rock.....	Consulting Botanist
Bro. M. Newell, In Charge Nursery, Hilo W. D. McBryde.....	

.....In Charge Nursery, Kauai

Division of Entomology.

E. M. Ehrhorn.....	Supt. of Entomology and Plant Inspector
D. B. Kuhns.....	Inspector's Assistant
Bro. M. Newell.....	
.....	Fruit and Plant Inspector, Hilo

D. T. Fullaway.....Field Entomologist
Miss A. BuchananLaboratory Asst.

Division of Animal Industry.

Victor A. Norgaard, V. S.....	
... Supt. and Territorial Veterinarian	
Dr. L. N. Case.....	Assistant
Dr. J. C. Fitzgerald, Dep. V. S....Maui	
Dr. H. B. Elliott, Dep. V. S....E. Hawaii	
Dr. A. R. Rowatt..Dep. V. S. W. Hawaii	
Dr. A. R. Glaizyter, Dep. V. S....Kauai	
Cyril Golding.....Asst., Kauai	
J. Richard.....Dairy and Live Stock Insp'r.	
Miss M. T. Kelly.....Clerk and Stenog.	
Miss Florence White.....	
.....Stenog. and Librarian	
Daniel Logan.....Editor Forester	
O. B. Lightfoot	Acting Supt. Marketing Division

BOUNDARY COMMISSIONERS.

Oahu-Maui.....	M. D. Monsarrat
Hawaii.....	W. H. Smith, Hilo
.....	J. A. Matthewman, Kailua
Kauai.....	Lyle A. Dickey

FENCE COMMISSIONERS.

Honolulu—John Markham, Norman E. Gedge.	
Ewa and Waianae—E. W. White, C. A. Brown.	
Waialua—R. Kinney, W. B. Thomas.	
Makawao—E. Morton, W. Henning, J. E. Pires.	
Hamakua—W. J. Rickard, A. L. Moses, J. K. White.	
N. Kohala—W. S. May, Ernest K. Kane- hailua, E. K. Akina.	
N. Kona—A. S. Wall, Thos. Silva, J. Ka- elemakule.	
S. Kona—E. K. Kaaua, L. P. Lincoln, A. Haile.	
Kau—Geo. Campbell, John T. Nakai, G. J. Becker.	
Puna—H. J. Lyman, G. D. Supe.	
Molokai—S. Fuller, James G. Munro, H. R. Hitchcock.	

LIQUOR LICENSE COMMISSIONERS.
City and County of Honolulu.

F. D. Lowrey.....	Chairman
C. A. Long.....	Secretary
R. A. Cooke, J. O. Carter, L. M. Vetlesen	
.....	County of Maui.
T. B. Lyons.....	Chairman
C. D. Lufkin, D. C. Lindsay, W. F. Kaae, D. H. Case.	
.....	County of Hawaii.
John T. Moir.....	Chairman
R. T. Guard, T. C. White, Saml P. Woods, J. A. M. Osorio.	
.....	County of Kauai.
W. H. Rice, Sr.....	Chairman
G. N. Wilcox, W. D. McBryde, B. D. Baldwin, J. R. Meyers.	

DEPARTMENT OF PUBLIC LANDS.

B. G. Rivenburg.....Commissioner
 Walter A. Engle.....Chief Clerk
 S. M. KanakanuiSurveyor and Title Searcher
 Henry Peters.....First Clerk
 Wm. J. Coelho.....Translator
 H. L. Kinslea.....Third Clerk
 Miss Rose Holt.....Fourth Clerk
 E. W. Armstrong.....Index Clerk

Sub-Agents.

1st District, Hilo and Puna.....Jos. G. Andrews
 2nd District, Hamakua.Jos. G. Andrews
 3rd District, Kona.....Julian R. Yates
 3rd District, Kau.....W. H. Hayesden
 4th District, Maui.....W. O. Aiken
 5th District, Oahu.....W. A. Engle
 6th District, Kauai.....W. D. McBryde
 Miss B. Hundley, Asst.

Division of Hydrography.

C. T. Bailey.....Chief Hydrographer and Engineer
 W. C. Woodward.....Office Engineer
 H. A. R. Austin, Asst. Engineer (Maui)
 R. D. Klise, W. V. Hardy.....Assistant Engineers
 J. Kaheaku.....Computer
 E. E. Goo.....Clerk

LAND BOARD.

Charles A. Rice.....Chairman
 W. C. Wilder.....Vice-Chairman
 J. F. Brown.....Secretary
 J. W. Waldron, W. H. C. Campbell,
 B. Cartwright, Jr.

BOARD OF COMMISSIONERS OF
PUBLIC ARCHIVES.

Chairman ex-officio.....C. P. Iaukea
 Commissioners—A. G. M. Robertson, M.
 M. Scott.
 Librarian.....R. C. Lydecker
 Translator.....Stephen Mahaulu

DEPARTMENT OF PUBLIC IN-
STRUCTION.

Superintendent.....H. W. Kinney
 Commissioners.

Oahu.....L. G. Blackman, Mrs. Theo. Richards
 Maui.....D. C. Lindsay
 Hawaii.....Mrs. B. D. Bond, W. H. Smith
 Kauai.....E. A. Knudsen
 Inspector, Normal...William C. Avery

Supervising Principals—
 Oahu—James C. Davis.
 Maui—Geo. S. Raymond.
 Hawaii, East—Bertha B. Taylor; Hawaii,
 West—Eugene Horner.
 Kauai—Bernice Hundley.

Secretary.....Miss Daisy Smith
 Asst. Secretary.....C. K. Stillman, Jr.
 Asst. Clerk.....Miss Eleanor L. Holt
 Asst. Clerk.....H. H. Williams

Board of Examiners.

W. C. Avery, Geo. S. Raymond,
 Eugene Horner, James C. Davis.
 Cyril O. Smith, Bernice Huntley
 Board Industrial Schools.

W. L. Whitney, Mrs. A. L. Andrews,
 Rev. V. Franckx, A. F. Griffiths,
 C. B. Cooper, Miss B. Taylor.

BOARD OF HEALTH.

President.....Dr. J. S. B. Pratt
 Members—H. F. Wichman, Dr. W. C.
 Hobdy, I. M. Stainback (ex-officio),
 G. P. Denison, Jno. Markham, G. J.
 Waller.
 Secretary.....K. B. Porter
 Sanitary Engineer.....Fred. Ohrt
 Chief Sanitary Officer, Oahu.C. Charlock
 Supt. Tuberculosis Bureau.....Dr. L. L. Patterson
 Registrar Genl. Births, Deaths and
 Marriages....Miss M. Hester Lemon
 Chief Clerk.....W. K. Simerson
 Asst. Clerk.....G. A. Hapai
 Stenographer.....Miss M. Weir
 Food Commissioner and Analyst....
A. W. Hanson
 Supt. Insane Asylum.Dr. W. A. Schwallie
 Supt. Leper Settlement...J. D. McVeigh
 Resident Physician,...Dr. W. J. Goodhue
 Chief Sanitary Officer, Hawaii—D. S.
 Bowman.
 Chief Sanitary Officer, Maui—J. L.
 Osmer.
 Chief Sanitary Officer, Kauai—F. B.
 Cook.

Government Physicians.

Oahu—
 H. Wood.....Waialua
 Geo. B. Tuttle.....Koolauopoko
 R. J. McGettigan.....Ewa and Waianae
 Dr. H. B. Cooper.....Aiea
 C. Buffett.....Koolauloa
 Maui—
 Franklin Burt.....Lahaina
 Dr. A. C. Rothrock.....Makawao and Kula
 R. C. Lichtenfels.....Hana
 Wm. Osmers.....Wailuku
 F. L. Sawyer.....Puunene and Kihel
 C. P. Durney..Kula and Upper Makawao
 Hawaii—
 O. A. Jeffreys.....N. Kona
 H. L. Ross.....S. Kona
 B. D. Bond.....N. Kohala
 R. G. Miller.....Hamakua and S. Kohala
 L. L. Sexton.....S. Hilo
 W. D. Whitman.....N. Hilo
 Frederick Irwin.....Puna
 K. Hoffmann.....Kau
 Kauai—
 Wm. Dunn.....Waimea
 A. H. Waterhouse.....Koloa
 F. L. Putnam.....Linhue
 K. Yanagihara.....Hanalei
 J. M. Kuhns.....Kawaihau

INDUSTRIAL ACCIDENT BOARD.

City and County of Honolulu—R. B.
 Booth, A. J. Campbell, F. O. Boyer,
 F. S. Steere, A. J. Wirtz.

Maui—W. H. Field, W. J. Cooper, Geo. Weight, G. Freeland, W. A. McKay.

Hawaii—D. Ewaliko, H. B. Elliot, Jas. Webster, H. A. Truslow.

Kauai—J. H. Moragne, H. H. Brodie, J. M. Lydgate, E. E. Mahlum, L. D. Timmons.

CIVIL SERVICE COM. BRD. HEALTH.

W. C. McGonagle, W. Wolters,
Dr. F. F. Hedemann.

BOARDS OF EXAMINERS.

Medical—Dr. R. W. Benz, Dr. J. T. McDonald, Dr. Grover A. Batten.

Pharmacy—H. H. Morehead, Dr. F. F. Hedemann, A. J. Gignoux.

Dental—O. E. Wall, M. E. Grossman, C. B. High.

Veterinary—V. A. Norgaard, W. T. Monsarrat, H. B. Elliott.

COMMISSIONERS OF INSANITY.

L. J. Warren.....Chairman
Drs. C. B. Cooper, G. H. Herbert.

PUBLIC UTILITIES COMMISSION.

Established 1913.

ChairmanW. T. Carden
MembersW. P. Thomas, A. J. Gignoux

CHAMBER OF COMMERCE OF HONOLULU.

Reorganized May 27, 1914.

President.....J. F. C. Hagens
1st Vice-President.....Norman E. Gedge
2d Vice-President.....F. C. Atherton
Treasurer.....A. Lewis, Jr.
Secretary.....Raymond C. Brown
Directors—Geo. H. Angus, E. A. Berndt, E. F. Bishop, F. E. Blake, A. W. T. Bottomley, A. L. Castle, R. A. Cooke, Geo. P. Denison, J. D. Dole, C. R. Hemenway, F. J. Lowrey, W. H. McInerny, E. H. Paris, T. H. Petrie, Geo. W. Smith, John Waterhouse, Norman Watkins.

MAUI CHAMBER OF COMMERCE.

President.....R. A. Wadsworth
Vice-President.....H. W. Rice
Secretary.....D. H. Case
Treasurer.....C. D. Lufkin

HILO BOARD OF TRADE.

Organized
President.....G. H. Vicars
Vice-President.....E. N. Deyo
Sec.-Treas.....V. L. Stevenson

KAUAI CHAMBER OF COMMERCE.

Organized 1913.
President.....F. Crawford
Vice-President.....T. Brandt
Secretary.....E. H. Broadbent
Treasurer.....J. I. Silva
Auditor.....W. N. Stewart

HAWAII PROMOTION COMMITTEE.

E. A. Berndt.....Chairman
Ed Towse, J. D. McInerny, A. F. Wall, A. R. Gurrey, Jr., Geo. H. Angus (Oahu), W. O. Aiken (Maui), James Henderson (Hawaii), W. H. Rice, Jr. (Kauai), Fred. J. Halton, Secretary.

HONOLULU STOCK AND BOND EXCHANGE.

Organized August 8, 1898.
President.....H. B. Giffard
Vice-President.....W. A. Love
Secretary.....D. L. Conkling
Treasurer.....Guardian Trust Co.

HAWAIIAN SUGAR PLANTERS' ASSOCIATION.

Re-organized Nov. 18, 1895.
President.....E. D. Tenney
Vice-President.....E. H. Wodehouse
Secretary and Treasurer.....W. O. Smith
Assistant Sec.-Treas.....L. J. Warren
Auditor.....J. W. Waldron

EXPERIMENT STATION OF PLANTERS' ASSOCIATION.

Station Staff.
H. P. Agee.....Director
R. C. L. Perkins, A. Koebbe.....Consulting Entomologists
Otto H. Swezey, F. Muir.....Entomologists
P. H. Timberlake, F. X. Williams.. Asst. Entomologists
H. L. Lyon.....Pathologist
E. L. Caum.....Asst. Pathologist
R. S. Norris.....Sugar Technologist
W. R. McAlpin. Asst. Sugar Technologist
P. S. Burgess.....Chemist
A. Brodie, J. M. Reynolds.....Asst. Chemists
F. R. Werthmueller, Geo. H. Hutchinson, G. R. Haddock. Asst. Chemists
J. P. Melanphy.....Fertilizer Sampler
J. A. Verret, R. S. Thurston, W. P. Alexander, R. M. Allen, J. T. Moir, Jr. Associate and Asst. Agriculturists

W. R. R. Potter.....Illustrator
H. B. Campbell.....Business Agent

HAWAIIAN CHEMISTS' ASSOCIATION

President.....W. G. Van Duker
Vice-President.....P. S. Burgess
Secretary-Treasurer.....S. S. Peck

**HAWAIIAN ENGINEERING
ASSOCIATION.**
Organized

Chairman.....C. B. Andrews
Vice-Chairman.....R. R. Hind
Secretary.....F. C. Boyer
TreasurerIrwin Spalding

**BOARD OF MARINE UNDERWRITERS
—AGENCIES**

Boston.....C. Brewer & Co.
Philadelphia.....C. Brewer & Co.
New York.....Bruce Cartwright
Liverpool.....Theo. H. Davies & Co.
Lloyds, London.....Theo. H. Davies & Co.
San Francisco.....Bishop Ins. Agency
Bremen.....F. A. Schaefer

**BOARD OF FIRE UNDERWRITERS OF
TERRITORY OF HAWAII.**

Jno. Waterhouse.....President
B. von Damm.....Vice-President
F. A. Bechert.....Secretary
H. Hackfeld & Co.....Treasurer
Audit Co. of Hawaii.....Auditor

QUEEN'S HOSPITAL.
Erected in 1860.

President.....Geo. W. Smith
Vice-President.....A. J. Campbell
Secretary.....Bruce Cartwright, Jr.
Treasurer.....Geo. C. Potter
Auditor.....Audit Co. of Hawaii
Resident Physician.....Dr. Merod
Specialist.....Dr. J. A. Morgan
Superintendent.....
Bookkeeper.....C. J. Daub
Head Nurse.....Miss Helen Macfarlane
Housekeeper.....Mrs. F. Kuhlmann
Trustees—A. J. Campbell, G. W. Smith,
G. C. Potter, W. A. Love, B. Cart-
wright, Jr., Edgar Henriques, J. E.
Jaeger.

LEAHI HOME.
Organized April 4, 1900.

President.....A. A. Young
Vice Presidents.....
...C. Montague Cooke, W. E. Brown
Secretary.....C. R. Hemenway
Treasurer.....A. W. T. Bottomley
Auditor.....W. F. Dillingham
Medical Supt.A. N. Sinclair, M. B. C. M.
Asst. Supt.Robt. Anderson
Matron.....Mrs. A. B. Chamberlain
Nurses.....Miss McBryde, Miss Ford
Clerk.....L. J. Fagg

CHILDREN'S HOSPITAL.

Opened Nov. 24, 1909.
President.....S. B. Dole
Vice-President.....Geo. P. Castle
Secretary.....Irene Dyches
Treasurer.....W. O. Smith
Auditor.....Audit Co. of Hawaii
Superintendent.....Miss J. N. Dewar
Trustees—S. B. Dole, W. O. Smith, G.
P. Castle, A. S. Wilcox, Allen Her-
bert, Geo. B. Isenberg, E. A. Mott-
Smith.

HOSPITAL FLOWER SOCIETY.

President.....Mrs. A. Gartley
Vice-President.....Mrs. R. D. Mead
Secretary.....Mrs. A. J. Gignoux
Treasurer.....Mrs. W. F. Soper

SAILORS' HOME SOCIETY.

Organized 1853.
Meets annually in December.

President.....F. A. Schaefer
SecretaryC. H. Atherton
Treasurer.....Jno. Waterhouse
Trustees—J. A. Kennedy, Geo. Ro-
diek, R. Ivers.

DAUGHTERS OF HAWAII.

Hon. Regent.....Mrs. B. F. Dillingham
Presiding Regent.....
First Vice-Regent.....Mrs. C. S. Holloway
Second Vice-Regent.....
Historian.....Mrs. R. D. Walbridge
Cor. Secretary.....Miss Anna Paris
Rec. Secretary.....Mrs. A. P. Taylor
Treasurer.....Mrs. A. Gartley

**TERRITORIAL LIBRARY,
HONOLULU LIBRARY ASSOCIATION.**

Organized March.
Incorporated June 24, 1879.

President.....Prof. M. M. Scott
Secretary.....J. H. Fisher
Treasurer.....A. Gartley
Auditor.....J. H. Fisher

LIBRARY OF HAWAII.

Trustees.
C. H. Atherton.....President
Rev. H. B. Restarick.....Vice-President
J. R. Galt.....Treasurer
Rev. W. D. Westervelt.....Secretary
F. E. Blake, Mrs. L. L. McCandless,
A. Gartley.

Library Staff.

Edna I. Allyn.....Librarian
Maud Jones, Alice E. Burnham.....Assts.
Mary F. Carpenter.....Cataloguer
Carrie P. Green.....Reference Librarian
Mary S. Lawrence.....Children's Librarian
Akana K. Ma.....Clerk
Helen J. Stearns.....Islands Dept.

HAWAIIAN HISTORICAL SOCIETY.
Organized Jan. 11, 1892.

President.....	W. F. Frear
Vice-President.....	W. A. Bryan, J. S. Emerson, F. M. Hatch.
Recording Secretary.....	Edgar Henriques
Cor. Secretary.....	W. D. Westervelt
Treasurer.....	Bruce Cartwright, Jr.
Librarian.....	Miss E. I. Allyn

KAUAI HISTORICAL SOCIETY.

President.....	Wm. Hyde Rice
Vice-President.....	J. M. Lydgate
Sec.-Treas.....	Miss E. N. Wilcox

BERNICE PAUAHI BISHOP MUSEUM.
Board of Trustees.

Albert F. Judd.....	President
E. F. Bishop.....	Vice-President
Wm. Williamson.....	Secretary
J. M. Dowsett.....	Treasurer
W. O. Smith, H. Holmes.....	Museum Staff.
William T. Brigham, A. M., D. Sc.....	Director
W. H. Dall, D. Ph. Hon. Cur. of Molusca	
John F. G. Stokes.....	Curator of Polynesian Ethnology
C. Montague Cooke, Jr., D. Ph.	Curator of Pulmonata
C. N. Forbes.....	Curator of Botany
Otto H. Swezey.....	Hon. Curator of Entomology
Miss E. B. Higgins.....	Librarian
Miss L. E. Lucas.....	Library Asst.
Mrs. E. Helvie.....	
.....	Superintendent of Exhibition Halls
J. W. Thompson....	Artist and Modeler
John J. Greene.....	Printer

BAR ASSOCIATION OF HAWAII.
Organized June 28, 1899.

President.....	J. W. Cathcart
Vice-President.....	E. M. Watson
Secretary.....	E. W. Sutton
Treasurer.....	A. M. Cristy

HAWAIIAN PHILATELIC SOCIETY.
Organized April 13, 1911.

President.....	Maj. R. W. Peck, 2d U.S. Inf.
Vice-President.....	Julius Unger
Secretary.....	C. J. Cooper
Treasurer.....	E. M. Ehrhorn
Librarian.....	E. L. Caum
Supt. Junior Soc.....	A. F. Cooke

Y. M. C. A. CHESS CLUB.
Organized Oct. 17, 1913.

President.....	C. H. Medcalf
Vice-President.....	H. W. Vaughan
Secretary.....	H. C. Jewell
Treasurer.....	H. B. Campbell

HAWAIIAN MEDICAL ASSOCIATION.
Organized May 24, 1895.

President	Dr. Herbert Wood
Vice-President.....	A. F. Jackson
Secretary.....	Dr. H. H. Blodgett
Treasurer.....	Dr. E. C. Milner
Directors—Drs. S. J. Hedemann, I. J. Shepherd, A. N. Sinclair.	

HAWAIIAN SOCIETY SONS OF THE AMERICAN REVOLUTION.

Organized June 17, 1895.

President.....	W. A. Bryan
Vice-President.....	G. P. Wilder
Secretary.....	J. T. Taylor
Treasurer.....	G. H. Tuttle
Registrar.....	H. B. Marriner
Board of Managers—L. R. Killam, C. S. Carlsmith.	

ALOHA CHAPTER, DAUGHTERS OF THE AMERICAN REVOLUTION.

State Regent...Mrs. W. Alanson Bryan	
Cnayt. Regent.....Mrs. Hermann Hugo	
Vice-Regent.....Mrs. J. M. Atherton	
Recording Sec...Miss Carolyn Church	
Treasurer.....Miss Charlotte V. Hall	
Registrar.....Mrs. C. B. Andrews	
Historian.....Mrs. J. W. Caldwell	
Chaplain.....Mrs. A. F. B. Judd	

HAWAIIAN EVANGELICAL ASSOCIATION.

Originally Organized 1823.

Constitution revised 1863. Annual Meeting June.

President.....	F. J. Lowrey
Vice Presidents.....	
...A. C. Alexander, Walter F. Frear	
Cor. Secty.....Rrs. H. P. Judd	
Rec. Secretary.....Rev. J. L. Hopwood	
Treasurer.....Theo. Richards	
Auditor.....Wm. J. Forbes	

WOMAN'S BOARD OF MISSIONS.

Organized 1871.

President.....	Mrs. Theo. Richards
Vice-Presidents—Miss Alice Knapp, Mrs. H. P. Judd.	
Recording Secty....Mrs. R. D. Williams	
Home Cor. Secty.....Edgar Wood	
Foreign Cor. Secty....Miss A. E. Judd	
Treasurer.....Mrs. B. F. Dillingham	
Asst. Treasurer.....Miss C. C. Varney	
Auditor.....W. J. Forbes	

MISSION CHILDREN'S SOCIETY.

Organized 1851. Annual Meeting June.

President.....	Gerrit P. Wilder
Vice-President.....	Rev. H. P. Judd
Secretary.....Mrs. R. W. Andrews	
Recorder.....R. W. Andrews	
Treasurer.....L. A. Dickey	

REGISTER AND DIRECTORY.

191

YOUNG MEN'S CHRISTIAN ASSOCIATION.

Organized 1869. Annual Meeting April.
 President.....F. C. Atherton
 Vice-President.....W. G. Hall
 Treasurer.....R. A. Cooke
 Rec. Secretary.....Chas. F. Clemons
 Executive Secty.....Arthur E. Larimer
 Associate Secty.....Glenn Jackson
 Membership Secty.....Harry Pomerantz
 Business Secty.....Floyd H. Emmans
 Educational Secty.....Rolla K. Thomas
 Physical Director.....Richard Whitcomb
 Gymnasium Director.....Chas. A. Pease
 Community Boys' Secy. Saml. W. Robley
 Boys' Dept. Secty.....Milo Vanek

ARMY AND NAVY Y. M. C. A.

Organized Aug. 3, 1917.

Committee of Management -- James Wakefield, chairman; F. D. Lowrey, Treas.; E. A. Berndt, Arthur G. Smith, Dr. James A. Morgan, John Waterhouse.
 Executive Officers
 W. A. Horn.....Supervising Secretary
 Howard N. Mosher.....Associate Secretary
 George A. Andrus, Thomas A. Fisher.....Asst. Secretaries

YOUNG WOMEN'S CHRISTIAN ASSOCIATION.

Organized 1900.

Hon. President....Mrs. B. F. Dillingham
 President.....Mrs. W. F. Frear
 Secretary.....Mrs. F. C. Atherton
 Cor. Secretary.....Mrs. Chas. T. Pitts
 Treasurer.....Mrs. I. J. Shepherd
 Gen. Secty.....Miss Grace Channon

WOMAN'S CHRISTIAN TEMPERANCE UNION OF HAWAII.

Organized December, 1884.

President.....Mrs. J. M. Whitney
 Vice-President.....Mrs. Ida Weedon
 Recording Secty.....Miss Florence Yarrow
 Cor. Secretary.....Mrs. E. W. Jordan
 Treasurer.....Miss Carrie A. Gilman

FREE KINDERGARTEN AND CHILDREN'S AID ASSOCIATION.

Organized 1895.

President.....Mrs. F. M. Swanzy
 Vice-Presidents—Mrs. W. F. Frear, Mrs. Theo. Richards, Mrs. S. B. Dole.
 Recording Secty.....Mrs. I. M. Cox
 Treasurer.....Mrs. E. A. Rath
 Auditor.....J. L. Cockburn

ASSOCIATED CHARITIES.

Organized June 7, 1899.

President.....J. R. Galt
 1st Vice-President.....Hon. S. B. Dole
 2nd Vice-President.....
 Treasurer.....Mrs. F. W. Macfarlane
 Secty. and Manager.....Edgar Brooks

STRANGERS' FRIEND SOCIETY.
 Organized 1852. Annual Meeting June.
 President.....Mrs. A. Fuller
 Vice-Presidents—Mrs. S. B. Dole, Mrs. A. A. Young.
 Secretary.....Mrs. S. M. Damon
 Treasurer.....Mrs. E. W. Jordan
 Auditor.....E. W. Jordan
 Directress.....Mrs. E. B. Waterhouse

BRITISH ASSOCIATION OF HAWAII.

Organized 1869.

President (ex-officio)....H.B.M.'s Consul
 Vice-President.....Rev. Wm. Ault
 Secretary.....A. L. C. Atkinson
 Treasurer.....W. H. Baird

HAWAIIAN HUMANE SOCIETY.

President.....M. F. Prosser
 Hon. President.....Mrs. S. B. Dole
 Vice-Presidents—Mrs. S. M. Damon,
 Mrs. R. D. Mead, Mrs. R. D. Walbridge, Mrs. E. P. Low, Mrs. W. R. Castle, Mrs. C. S. Holloway.
 Secretary.....Mrs. E. D. Kilbourne
 Treasurer.....Mrs. E. A. Mott-Smith
 Auditor.....H. M. Dowsett
 Agent.....Mrs. J. Smythe
 Hon. Agent.....Miss Lucy K. Ward

OAHU CEMETERY ASSOCIATION.

President.....F. J. Lowrey
 Vice-President.....S. G. Wilder
 Secretary.....H. H. Walker
 Treasurer.....Hawaiian Trust Co.

ANTI-SALOON LEAGUE OF HAWAII.

Organized March 4, 1901.

Superintendent.....John W. Wadman
 President.....L. L. Loofbourow
 Vice-President.....A. E. Larimer
 Vice-Pres. Honorary. Mrs. J. M. Whitney
 Secretary.....Geo. W. Paty
 Treasurer.....W. A. Bowen

THE OUTDOOR CIRCLE.

(For the beautifying of Honolulu.)

President.....Mrs. L. A. Thurston
 1st Vice-President.....Mrs. A. J. Campbell
 2d Vice-President.....Mrs. I. Cox
 Sec.-Treas.....Mrs. W. L. Moore
 Ex. Officer.....Mrs. A. E. Murphy

PACIFIC CLUB.

Organized 1852. Premises on Alakea Street, two doors below Beretania.

President.....Dr. St. D. G. Walters
 Vice-President.....A. J. Campbell
 Secretary.....Geo. C. Potter
 Treasurer.....J. L. Fleming

UNIVERSITY CLUB.

Organized 1905.

President.....R. B. Anderson
 Vice-President.....W. L. Whitney
 Secretary.....R. C. Walker
 Treasurer.....A. M. Nowell
 Governors—D. L. Withington, A. G. Hawes, Gen. John P. Wisser, U.S.A.

COMMERCIAL CLUB OF HONOLULU.

Organized Aug. 30, 1906.

President.....	S. S. Paxson
Vice President.....	J. J. Belser
Secretary.....	G. T. Kluegel
Treasurer.....	B. E. Noble

BRITISH CLUB.

Club Rooms Campbell Block.

President.....	Fred. Harrison
Vice-President.....	Geo. Bustard
Secretary.....	P. K. McLean
Treasurer.....	F. W. Jamison
Auditor.....	H. D. Young

COUNTRY CLUB.

Organized 1906.

President.....	E. I. Spalding
1st Vice-President.....	A. C. Wall
2nd Vice-President.....	A. F. Judd
Secretary.....	G. H. Buttolph
Treasurer.....	F. T. P. Waterhouse

OUTRIGGER CLUB.

Organized May, 1908.

President.....	E. T. Chase
Vice-President.....	G. H. Buttolph
Secretary.....	P. G. H. Deverill
Treasurer.....	L. C. Thompson
Captain.....	G. D. Center

HUI NALU (Surf Club).

Organized 1911.

President.....	Harold Castle
Vice-President.....	Al. Castle
Secretary.....	Robt. McB. Purvis
Treasurer.....	George I. Brown
Commodore.....	Duke
Captain.....	J. K. Evans
Auditor	Thos. Tredway

President.....	W. T. Rawlins
Vice-President.....	A. T. Longley
Sec.-Treas.	Jos. Stickney
Registration Com.----	J. F. Soper, Ben. Clark, W. T. Rawlins.

**KONA IMPROVEMENT CLUB,
HAWAII**

Organized 1912.

Rev. Albert S. Baker.....	President
F. R. Greenwell.....	Vice-President
W. D. McKillop.....	Treasurer
L. Macfarlane	Secretary
Executive Committee ---	Rev. A. S. Baker, Chairman; L. Macfarlane, Secretary; J. P. Curts, T. C. White, R. Wallace, A. L. Greenwell, W. D. McKillop.

AD CLUB.

President.....	W. R. Farrington
1st Vice-President.....	C. R. Frazier

2nd Vice-President.....	Thos. Sharp
Secretary.....	J. K. Butler
Treasurer.....	J. H. Soper

HONOLULU (STEAM) FIRE DEPARTMENT.

Originally organized 1851, and conduct-	ed as volunteers till March 1, 1893,
when it was changed to a paid dept.	
Chief Engineer—Chas. Thurston.	
Asst. Engineer—Wm. Blaisdell.	
Engine No. 1—Location Central Station,	cor. Fort and Beretania streets.
Engine No. 2—Location, Central Sta-	tion, cor. Fort and Beretania Sts.
Chemical Co. No. 1—Location, Central	Station, cor. Fort and Beretania Sts.
Hook and Ladder Truck—Location, Cen-	tral Station, cor. Fort and Beretania.
Engine Co. No. 3—Location cor. Wilder	avenue and Piikoi street.
Engine Co. No. 4—Location King street	and Austin lane.
Engine Co. No. 5—Location Kaimuki.	

OAHU COLLEGE.

Administrative Officers.

Arthur F. Griffiths, A.M.....	President
Levi C. Howland.....	Ast. to the Pres.

Academy Teachers.

Ernest T. Chase.....	Principal
Godfrey L. Bergman.....	Mathematics
Miss Susan G. Clark.....	Latin
Miss Charlotte P. Dodge.....	History
Miss Antoinette J. Foster, Frank E.	

Midkiff, Arthur L. Silverman..... English

Mrs. Edith W. Guild.....	Typewriting
Levi C. Howland.....	Bookkeeping

Miss Edith L. Knights	Stenography and Typewriting
Wilbur J. MacNeill, Mrs. Jean P.	

Severance, Mrs. Ruth H. Thompson.....	Science
Miss Elizabeth P. Macomber	French

Harold E. Marsh.....	Mathematics and Latin
John H. Rollins	Mathematics and Mech. Drawing

Miss Daisy D. Spry	German and Latin
Miss Helen Alice Storms	French and Latin

Miss Mary Elizabeth Appleton	French and Latin
Miss Mary Elizabeth Appleton—Sub-	stitute in English during Nation-

al Guard Encampment.	
Punahou Preparatory School	

Charles T. Pitts.....	Principal
Miss Mary P. Winne	Assoc. Principal

Misses Emma C. Barnard, Nina F.	Grades and Penmanship
Berkley, Florence N. Carter, Alice	

L. Castle, Lucy L. Doggett,	
Blanche M. Folsom, Clara L. Fra-	

sser	Grades
Miss Helen Hasty	Grades and Sewing

Miss Lillian H. Welch	Grades and Penmanship
Misses Evangeline Holmes, Anna F.	

Johnson, Vera H. Klotz, Marguer	
ite McKinley, Maurine Samson,	

Bessie Potts Walthal, Olive Wolf	
.....	Grades

Special Teachers.

Miss Alice Arnold	...Physical Training
Miss Violet D. Austin	...Asst. Librarian
Miss Helen Grace Cadwell	.....Piano and Voice
Miss Margaret E. Clarke, Miss E. Lillian Parrish, Miss Margaret Way	.....Piano
Miss Aileen L. Gibb, Miss Catherine Johnson	.....Office Secretaries
Miss Mabel M. Hawthorne	.....Librarian
Edwin H. Ideeler	.....Violin
Miss Jean Porterfield	.....Oral Expression
Miss Anna M. Pian	.....Accompanist
Miss Helen C. Spaulding	.....Matron
Mrs. Edith D. Claybourne	.....Asst. Matron
Miss Genevieve Springston	.....Free Hand Drawing
Miss Jane Winnie	.....School Singing
Frank Barwick	.....Supt. of Grounds
Henry G. Wootton	.....Engineer
Miss Helen Jones	.....Swimming
Major Claire R. Bennett	.....Military Instructor

BOARD OF REGENTS, COLLEGE OF HAWAII.

Wallace R. Farrington	.....Chairman
Arthur L. Dean	.....Secretary
Regents—Alonzo Gartley, C. R. Hem-enway, Mrs. J. R. Ashford, F. L. Waldron	
	The Faculty.
Arthur L. Dean, A.B., Ph.D.	.....Pres. and Prof. of Chemistry

John S. Donaghho, A.B., A. M.	.....Prof. of Math. and Astronomy (On leave of absence 1917-18)
John M. Young, B.S., M.E.	.....Prof. of Engineering, College Engr.
William A. Bryan, B.S.	.....Prof. of Zoology
Arthur E. Keller, C. E., LL.B.	.....Prof. of Civil Engineering
Frank T. Dillingham, B. S.	.....Prof. of Chemistry

Arthur L. Andrews, B.L., M.L., Ph.D.	.....Professor of English
Vaughan MacCaughey, B.S.A.	.....Professor of Botany
Herbert S. Walker, A.B.	.....Professor of Sugar Technology
L. A. Henke, B.S.	.....Prof. of Agronomy
Joseph F. C. Rock	.....Botanist

Minnie E. Chipman	.....Professor of Ceramics and Design
Arnold Romberg, B.S., Ph.D.	.....Professor of Physics
David L. Crawford, B.A., M.A.	.....Professor of Entomology
Elizabeth Matthews, B.S., M.S.	.....Professor of Household Science
Mildred M. Yoder, Ph.B.	.....Instructor in History and Economics

John McTaggart	.....Instructor in Shop Work
Maria Heuer	.....Asst. Prof. of Modern Languages
Mildred Gould Cowdrey, B.S.	.....Instructor in Chemistry
Anna von Balzen Dahl	.....Instructor in Textiles
Harvey J. Wentzel, B.S.	.....Instructor in Agriculture

S. D. Zeldin, Ph.D.	.....Instructor in Mathematics
Alice E. Harbaugh	.....Asst. in Drawing and Ceramics
	.....Instructor in Engineering
Elizabeth L. Bryan, Sc.D.	.....Librarian
Grace W. Bryan	.....Librarian

MID-PACIFIC INSTITUTE.

Officers of the Board.

Dr. R. D. Williams	.....President
George P. Castle	.....Vice-President
Frank C. Atherton	.....Treasurer
H. M. Blowers	.....Secretary
W. A. Bowen	.....Auditor

Officers and Teachers of Mid-Pacific Institute.

Dr. R. D. Williams	.....President
Merle L. Copeland	.....Asst. Treasurer
Harry Stone	.....Supt. Farm and Grounds
George H. Sueoka	.....Bookkeeper

Mills School.

H. M. Blowers	.....Asst. Principal
Mrs. Philip Frear	.....Matron
Anna M. Bille, Edna Lochridge	.....English
A. E. Wyman	.....Mathematics
Elizabeth T. Kastle	.....Science
Robert E. Stone	.....Religious Education and History
A. Given	.....Physical Education
Edna M. Byrd	.....5 and 6 Grades
E. E. Lancaster, M. A.	.....Major
	.....Commercial
Rue H. Beaty	.....3 and 4 Grades
H. L. Abell	.....Manual Training
N. T. Booth	.....7 and 8 Grades
Edith Cold	.....Primary
Y. Sakai, Japanese; T. K. Yan, Chinese Y. M. Park, Korean	

Kawaiahao Seminary.

Mattie Paine	.....Principal
Ruth Mylroie	.....4 to 8 Grd. Arith, inc.
Ruth Yeomans	.....7 and 8 Grades
Ruth S. Tubbs	.....Music
Georgia Hays	.....Playground
Helen M. Abell	.....4 and 5 Grades
Mary F. Varley	.....Hand-work
Roselle F. Faast	.....Primary, 1, 2 and 3 Grades
Jane L. Oyer	.....Nurse
Emily Vieira	.....Asistant
Elizabeth Niemeyer, Pauline Bailey, Mabel Ai, Lily Kaholo, A. Akiu	
	.....Assistants

LIST OF OFFICERS AND TEACHERS,
KAMEHAMEHA SCHOOLS, 1917-18.

E. C. Webster	.....President
	School for Boys.
Chas. R. Bostwick	.....Principal
U. Thompson	.....Science
C. G. Livingston	.....Drawing
E. G. Bartlett	.....Mathematics
J. J. Mengel	.....Blacksm. and Forgling
M. E. Crosman	.....Woodworking
D. H. Reamy	.....Machinist
E. E. Baty	.....Electrician

R. J. Borden.....	Agriculturist	The Hawaiian Church Chronicle, issued on the first Saturday of every month.
Emma E. Winslow, Marjorie Wood.....	English	Rt. Rev. H. B. Restarick, Editor.
R. N. Hudspeth.....	Music and Math.	
Capt. C. R. Bennett.....	Military Training	
	Preparatory Department.	
Alice E. Knapp.....	Principal	The Paradise of the Pacific, issued monthly.
Mildred H. Ayres.....	Primary	Mrs. E. A. Langton-Boyle, Publisher.
Nevada Moore.....	Manual Training	
A. G. Hottendorf.....	Printing	The Mid-Pacific Monthly, an illustrated descriptive magazine.
Laura L. Newell.....	Upper grades	Alex. Hume Ford, Editor and Publisher.
Elizabeth Henry.....	Lower grades	
	School for Girls	
Abbie H. Newton.....	Principal	The Hawaiian Forester and Agriculturist, issued monthly under direction of Board of Com. Agr. and Forestry.
Zella M. Breckenridge.....	Mathematics	Daniel Logan, Editor.
Carolyn E. Church.....	Domestic Arts	
Florence J. Lowe.....	Geography	
Anna M. Reid.....	English	The Kuoko (native), weekly, issued every Friday morning by the Hawaiian Gazette Co., Ltd. Solomon Hanohano, Editor.
Ora L. Saunders.....	Nursing	
H. Sue Markley.....	History	
Gert. M. Knowles.....	Music	Aloha Aina (native), issued every Saturday. J. T. Ryan, Editor.
Winifred Farwell.....	Dom. Science	
Elizabeth Mitchell.....	Drawing	Ka Holomua (native), issued each Saturday.
Louise E. Cornell.....	Physical Director	
Evelyn Fisher.....	Dressmaking	Ka Puuhonua (native), issued each Friday, Akaiako Akana, Editor.
	Other Officers and Assistants	
E. E. Youtz.....	Chaplain	O Luso (Portuguese), issued weekly on Saturdays. M. G. Santos, Editor.
H. E. King.....	Acct. and Pur. Agent	
Lillian M. Osgood.....	Sec'y and Acct.	Chee Yow Shin Bo (The Liberty News), tri-weekly, Chinese.
Berlinda K. Murray.....	Stenographer	
Alice E. Keyes, Julia Coleman, Lydia K. Aholo, Margretha Dower, Lilia Nainoa.....	Office Assts.	Sun Chung Kwock Bo, tri-weekly. Chinese.
Laura C. Hillmer, Bertha L. Van Auken.....	Matrons	Hawaii Shinpo, issued daily in Japanese. H. Tsurushima, Editor.
Lucilla Kamakawiwoole, Jessie E. Maxwell, Harriet E. McCracken, Eliza Nainoa, Daisy Bell, Keahi Aholo.....	Asst. Matrons	The Daily Nippu Jiji. Y. Soga, Editor. issued by the Nippu Jiji Co., Ltd.
Dr. J. R. Judd.....	Physician	Hilo Daily Tribune, issued by the Tribune Pub. Co., H. E. Boothby, Editor.
Josephine Marquardt.....	Nurse	
Emily Keapo.....	Nurse Asst.	The Daily Post-Herald, issued at Hilo by the Post-Herald, Ltd., M. G. Maury, Editor.

PRINCIPAL PUBLICATIONS.

The Hawaiian Gazette, issued semi-weekly by the Hawaiian Gazette Co., Ltd., on Tuesdays and Fridays. R. O. Matheson, Editor.		The Kohala Midget, issued each Thursday, at Kohala. Dr. J. F. Cowan, Editor.
Sunday Advertiser, issued every Sunday morning by the Hawaiian Gazette Co., Ltd. R. O. Matheson, Editor.		The Maui News, issued weekly at Wailuku, Maui. L. D. Timmons, Editor and Manager.
The Daily Pacific Commercial Advertiser, issued by the Hawaiian Gazette Co. every morning (except Sunday). R. O. Matheson, Editor.		The Weekly Times, Wailuku, Maui, issued on Tuesday, A. V. Vetteson, Publisher.
The Honolulu Star-Bulletin, issued every evening (except Sundays), by the Honolulu Star-Bulletin, Ltd. Riley H. Allen, Editor. Semi-weekly issued on Mondays and Thursdays.		The Garden Island, issued weekly at Lihue, Kauai. K. C. Hopper, Managing Editor.
The Guide, issued every Tuesday and Friday morning by the Guide Pub. Co.		Hoku o Hawaii, issued on Friday of each week, at Hilo. Rev. S. L. Desha, Editor.
The Friend, Organ of the Hawaiian Board, issued on the first of each month. F. S. Scudder, Managing Editor.		THE HAWAIIAN ANNUAL, issued the latter part of December for the following year. Thos. G. Thrum, Editor and Publisher.

HONOLULU LODGES, ETC.

Lodge le Progres de l'Oceanie No. 371, F. & A. M.; meets on the last Monday in each month in Masonic hall.

Hawaiian Lodge, No. 21, F. & A. M.; meets in its Hall, Masonic Temple, corner Hotel and Alakea streets, on the first Monday in each month.

Honolulu Chapter, No. 1, R. A. M.; meets in Masonic Hall on the third Thursday of each month.

Honolulu Commandery, No. 1, Knights Templar; meets in Masonic Hall on second Thursday of each month.

Mystic Shrine, Aloha Temple. No stated time of meeting. Meets at Masonic Hall.

Kamehameha Lodge of Perfection, No. 1, A. & A. S. R.; meets in Masonic Hall on the fourth Thursday of each month.

Nuuanu Chapter of Rose Croix, No. 1, A. & A. S. R.; meets in Masonic Hall on the first Thursday in the month.

Alexander Liholihi Council, No. 1, of Kadosh; meets on the third Monday of alternate months from February.

Honolulu Lodge, No. 409, F. & A. M.; meets at Masonic Hall every second Monday of the month.

Leahi Chapter, No. 2, Order of the Eastern Star; meets on third Monday of each month in Masonic Hall.

Lei Aloha Chapter, No. 3, Order of the Eastern Star; meets on second Saturday of each month in Masonic Temple.

Harmony Chapter, No. 4, Order of the Eastern Star, meets on third Saturday of each month in Masonic Temple, at 7:30 p. m.

Excelsior Lodge, No. 1, I. O. O. F.; meets at the hall in Odd Fellows' Building, on Fort St., every Tuesday evening.

Harmony Lodge, No. 2, I. O. O. F.; meets each Monday evening in Odd Fellows' Building, Fort street.

Pacific Degree Lodge, No. 1, Daughters of Rebekah; meets in Odd Fellows' Building, Fort street, second and fourth Thursdays of each month.

Olive Branch Rebekah, No. 2, I. O. O. F.; meets first and third Thursdays each month in Odd Fellows' Building.

Polynesian Encampment, No. 1, I. O. O. F.; meets in Odd Fellows' Building, Fort street, first and third Fridays of each month.

Canton Oahu, No. 1, P. M. I. O. O. F.; meets second Friday each month in Odd Fellows' Hall, Fort St.

Mystic Lodge, No. 2, K. of P.; meets every Friday evening at Pythian Hall, cor. Beretania and Fort streets.

Section N. 225—Endowment Rank, K. of P.; meets on the second Saturday of January, July and December in Pythian Hall.

Honolulu Temple, No. 1, Rathbone Sisters; meets in Pythian Hall, first and third Tuesday evenings of each month.

Wm. McKinley Lodge, No. 8, K. of P.; meets first and third Tuesday evenings in Pythian Hall.

Hawaiian Tribe, No. 1, I. O. Red Men; meets on first and third Thursdays of each month at Odd Fellows' Hall.

Court Lunalilo No. 6600, A. O. of Foresters; meets at K. of P. Hall on first and third Wednesdays of each month.

Court Camoës No. 8110, A. O. F.; meets second and fourth Tuesday evenings of month in San Antonio Hall.

Theo. Roosevelt Camp, No. 1, Dept. of Hawaii, U. S. W. V.; first and third Saturdays, in their hall.

Geo. C. Wiltse Camp, Sons of Veterans; meets on third Tuesday of each month in San Antonio Hall.

Capt. Cook Lodge, No. 353, Order Sons of St. George; meets at Pythian Hall every Thursday evening.

Court Hawaii, No. 3769, Independent Order of Foresters, meets third Monday of each month.

Damien Council, Young Men's Institute; meets second and fourth Wednesdays of each month at Catholic Mission Hall.

Honolulu Lodge, B. P. O. Elks, 616; meets every Friday evening in the Elks' Building, King street near Fort.

Honolulu Aerie, No. 140, Fraternal Order of Eagles, meets second and fourth Wednesdays each month in K. of P. Hall.

Honolulu Lodge No. 1, Modern Order of Phoenix; meets every Thursday evening at their home, cor. Fort and Beretania.

Honolulu Lodge, I. O. O. M., No. 800, meets second and fourth Thursdays of the month in Pythian Hall.

American Association of Masters and Pilots of Steam Vessels, Honolulu Harbor, No. 54; meets first Sunday of each month at 7 p. m. in Odd Fellows' Hall.

Marine Engineers' Beneficial Association No. 100; meets every second and fourth Monday nights at K. of P. Hall.

Kamehameha Lodge (native); meets last Thursday of each month in Odd Fellows' Hall.

Kauikeaouli Lodge, No. 1 (native); meets on first and third Fridays each month in San Antonio Hall.

PLACES OF WORSHIP.

Central Union Church, Congregational, cor. Beretania and Richards streets; Rev. A. W. Palmer, Minister, Rev. J. L. Hopwood, assistant minister. Services every Sunday at 11 a. m. and 7:30 p. m. Sunday school meets one hour before morning service. Prayer meeting Wednesday evenings at 7:30.

Kalihhi Union Church, King street, Kalihhi; W. B. Coale, A.B., pastor. Sunday school at 9:45 a. m. Gospel services at 11 a. m. and 8 p. m.

Methodist Episcopal Church, corner Beretania and Victoria streets; Rev. L. L. Loofbourouw, pastor. Sunday services 11 a. m. and 7:30 p. m. Sunday school meets at 10 a. m. Prayer meeting Wednesdays at 7:30 p. m.

The Christian Church, Kewalo street. David Carey Peters, pastor. Sunday services at 11 a. m. and 7:30 p. m. Sunday school meets at 9:45 a. m. Prayer meeting Wednesday evenings, at 7:30.

Salvation Army, services held nightly at hall, 69 Beretania St., with Sunday services at the usual hour.

Roman Catholic Church, Fort street, near Beretania; Rt. Rev. Libert Boeynaems, Bishop of Zeugma. Services every Sunday at 10 a. m. and 4:30 p. m. Low mass every day at 6 and 7 a. m. High mass Sundays and Saints' days at 10 a. m.

St. Andrew's Cathedral, Protestant Episcopal; entrance from Emma street, near Beretania. Rt. Rev. Henry Bond Restarick, Bishop of the Missionary District of Honolulu; Rev. Wm. Ault, Vicar. Holy Communion, 7; Sunday school, 10; morning prayer, litany and sermon, 11; Hawaiian service, 3:30; evening prayer and sermon, 7:30.

Chinese Congregation. Rev. Kong Yin Tet, Curate. Services on Sunday at 11 a. m. and 7:30 p. m. Evening prayer every Wednesday at 7 p. m.

St. Clement's Chapel, Punahou. Services on Sundays. Holy Communion, 7 a. m. Morning prayer, 11 a. m.; evening prayer, 7:30 p. m. Rev. John Usborne, rector; Rev. C. H. Tracy, vicar.

Epiphany Mission, Kaimuki. Rev. F. B. Eteson, priest in charge. Sunday services at 7:30 and 11 a. m. Sunday school at 10.

First Church of Christ, Scientist, cor. Wilder and Kewalo streets. Sunday services 11 a. m. Sunday school at 9:45.

Christian Chinese Church, Fort street; Rev. Tse Kei Yuen, acting pastor. Services every Sunday at 10:30 a. m. and 7:30 p. m. Prayer meeting Wednesdays at 7:30 p. m.

German Lutheran Church, Beretania St.; Dr. A. Hoermann, pastor. Services on Sunday at 11 a. m.; Sunday school at 10 a. m.

Portuguese (Protestant) Mission; Rev. A. V. Soares, pastor. Services every Sabbath at the usual hour. Sunday school at 3 p. m. Chapel situated corner of Punchbowl and Miller streets.

Reorganized Church of Jesus Christ. Chapel on King street, near Thomas Square; Sunday school at 10 a. m.; preaching in Hawaiian at 11 a. m. in English at 7:30 p. m.

Seventh Day Adventists; Rev. F. H. Conway, pastor. Chapel, 767 Kinau street. Sabbath school Saturdays at 10 a.m.; preaching at 11. Wednesday prayer and missionary meeting at 7:30 p. m.

Japanese Union Church (connected with Hawaiian Board Missions); Rev. T. Hori, pastor. Hold services at 10 a. m. Preaching at 11 a. m. and 7:30 p. m. Sunday services. Prayer and praise meeting Wednesdays at 7 p. m.

Korean Methodist Church, Rev. H. J. Song, pastor; Punchbowl St. near Beretania. Services at usual hours.

Japanese Methodist Church. Rev. C. Nakamura, pastor. Hold services in chapel on River street, near St. Louis College.

Japanese Church, cor. Kinau and Pensacola Sts., Rev. T. Okumura, pastor; hold regular services at the usual hours.

Bishop Memorial Chapel, Kamehameha Schools, Rev. E. E. Youtz, Chaplain. Morning services at 11.

NATIVE CHURCHES.

Kawaiahao Church, cor. King and Punchbowl streets; Rev. H. H. Parker, pastor. Services in Hawaiian every Sunday at 11 a. m. and 7:30 p. m. Sunday school at 10 a. m. Prayer meeting Wednesdays at 7:30 p. m.

Kaumakapili Church, King street, Palama. Rev. H. K. Poepoe, pastor; Rev. S. K. Kamaiopili, assistant. Sunday services at the usual hours.

COUNTY OFFICIALS.

CITY AND COUNTY OF HONOLULU.

Mayor.....Joseph J. Fern
 Sheriff.....Chas. H. Rose
 ClerkD. Kalauokalani
 AuditorJas. Bicknell
 Treasurer.....D. L. Conkling
 City and County Attorney.....A. M. Brown
 Supervisors—Wm. Ahia, Chas. N. Arnold, C. H. Bellina, Ben Hollinger, W. H. McClellan, E. A. Mott-Smith, Lester Petrie.
 County Engineer.....A. S. Cantin
 Chief Engineer Fire Dept.—Chas. H. Thurston.
 Asst. Engineer Fire Dept. — Wm. Blaisdell.
 Supt. Electric Light Dept. and Police and Fire Alarm System—W. L. Frazee.
 1st Deputy County Attorney—A. M. Cristy.
 2nd Deputy County Attorney—Chas. A. Davis.
 Prosecuting Attorney, Police Court —C. F. Chillingworth.
 Bandmaster Hawaiian Band—Robert H. Baker.
 Supt. Public Parks—A. K. Vierra.
 Supt. Kapiolani Park—John H. Wise.

COUNTY OF MAUI.

SheriffClement Crowell
 AttorneyE. R. Bevans
 AuditorCharles Wilcox
 TreasurerL. M. Baldwin
 ClerkW. F. Kaae
 Supervisors—S. E. Kalama, chairman; D. T. Fleming, R. A. Drummond, P. Cockett, J. N. Uahinui.

COUNTY OF HAWAII.

SheriffSamuel K. Pua
 AuditorS. M. Spencer
 ClerkArchibald Hapai
 AttorneyW. H. Beers
 TreasurerChas. Swain
 PhysicianC. L. Stow
 Supervisors—S. Kauhane, chairman; J. R. Yates, A. M. Cabrinha, E. H. Lyman, W. A. Todd, Jas. Ako, A. Akana.

COUNTY OF KAUAI.

SheriffW. H. Rice, Jr.
 AuditorCarl Maser
 ClerkJ. M. Kaneakua
 AttorneyS. K. Kaeo
 TreasurerA. G. Kaulukou
 Supervisors—Waimea, Th. Brandt; Koloa, W. D. McBryde; Lihue, H. D. Wishard; Kawaihau, J. F. Bettencourt; Hanalei, A. Menefoglio.

FEDERAL OFFICIALS.

DEPARTMENT OF JUSTICE.
U. S. DISTRICT COURT.

Hon. H. W. Vaughn } Judges U. S.
 J. B. Poindexter } Dist. Court
 S. C. Huber.....U. S. Attorney
 J. J. Banks.....Asst. U. S. Attorney
 J. J. Smiddy.....U. S. Marshal
 O. F. Heine..Office Dep. U. S. Marshal
 L. K. SilvaAsst. Office Dep. U. S. Marshal
 A. E. Harris.....Clerk
 Wm. L. RosaDeputy Clerk
 Geo. S. Curry, F. J. H. Schnack.....U. S. Commissioners
 H. L. Grace....Referee in Bankruptcy
 J. A. M. Osorio....U. S. Commsnr., Hilo
 R. T. Forrest.....Referee, Hilo
 C. D. Lufkin.....Referee, Kahului
 Regular Terms:—At Honolulu on the second Monday in April and October.
 Special Terms:—May be held at such times and places in the district as the Judge may deem expedient.
 Miss F. McDermot, Lillian NohoweeClerks, U. S. Attorney
 H. F. Neiterd.....U. S. Court Reporter
 Mrs. Sara Holland—Secretary to U. S. District Judges.
 U. S. Jury Commissioners—A. E. Harris, W. H. Smith.

TREASURY DEPARTMENT.
CUSTOMS DIVISION.

Malcolm A. Franklin.....Collector
 Raymer Sharp—Special Deputy Collector and Chief Examiner.
 A. B. Ingalls.....Examiner and Gauger
 John W. Short..Chief Liquidating Clerk
 J. K. Brown.....Dep. Col. and Cashier
 F. L. Beringer, R. H. Bemrose, E. H. Boyen, C. J. Cooper, R. FriedersdorffExaminers
 J. B. Gibson, P. M. Naluai, M. J. Scanlan, W. D. WilderDeputy Collector and Clk.
 E. E. Miller, M. G. Johnston, Geo. W. Lucas, Joseph Ordenstein, R. K. Brown, E. S. McGrew.....Clerks
 E. D. Ferreira..Stenog. and Typewriter
 James I. Arcia.....Weigher
 R. J. TaylorDep. Coll. and Insp. in Chge.
 C. A. Hills.....Clerk
 E. A. K. Williams.....Clerk
 John A. Akana.....Night Ins.
 D. C. Lindsay..Dep. Collector, Kahului
 W. V. Kolb.....Dep. Collector, Hilo
 E. Madden..Dep. Collector, Mahukona
 G. B. Leavitt.....Dep. Collector, Koloa

INTERNAL REVENUE OFFICE.

Ralph S. Johnstone
 W. G. Ashley, Jr. Division Deputy
 Aug. S. Costa
 ... Stamp and Div. Deputy Collector
 J. S. Mackenzie Dep. Collector
 Lee Sing Stamp Dep. and Cashier
 F. S. Hishimoto Messenger
 E. K. Kekuewa Gauger
 A. P. Helbush, Hilo. Storekeeper-Gauger

U. S. DEPARTMENT OF LABOR.
IMMIGRATION SERVICE.

R. L. Halsey Inspector in Charge
 H. B. Brown Act. Inspector in Charge
 Edwin Farmer, J. L. Milligan. Inspectors
 Chas. T. Howard, Hazel G. Cunningham Clerks
 Tomizo Katsunuma, C. Tajima Japanese Interpreters
 Hee Kwong Chinese Interpreter
 Mrs. Y. Watanabe Matron

DEPARTMENT OF AGRICULTURE.
U. S. WEATHER BUREAU.

A. M. Hamrick Meteorologist
 Wm. W. Wyatt, Carl A. Reichelt Asst. Observers

U. S. Magnetic Station
 Frank Neumann Observer

HAWAII EXPERIMENT STATION.

J. M. Westgate Agronomist in Charge
 J. E. Higgins Horticulturist
 M. O. Johnson Chemist
 C. W. Carpenter Plant Pathologist
 F. G. Krauss Supt. Extension Work
 R. A. Goff Asst. Agronomist
 In Charge Glenwood Substation.
 Kim A. Ching Asst. Chemist
 C. A. Sahr Asst. Agronomist
 J. H. Cowan Asst. Horticulturist
 J. W. Love Executive Clerk

PUBLIC HEALTH, UNITED STATES SERVICE.

F. E. Trotter, Surgeon, U. S. P. H. S. Chief Quarantine Officer.
 L. E. Hooper, Asst. Surgeon, U. S. P. H. S.
 A. N. Sinclair, Acting Assistant Surgeon U. S. P. H. S.
 W. F. James, Asst. Surg. U. S. P. H. S.
 G. I. Van Ness, Pharmacist U.S.P.H.S.
 Emma F. Smith, Med. Insp., U.S.P.H.S.
 L. L. Sexton, Act. Asst. Surgeon, U. S. P. H. S., Hilo, Hawaii, T. H.
 Wm. Osmers, Act. Asst. Surgeon, U. S. P. H. S., Kahului, Maui, T. H.
 Franklin Burt, Act. Asst. Surg. U. S. P. H. S., Lanaina, Maui, T. H.
 A. H. Waterhouse, Act. Asst. Surgeon, U.S.P.H.S., Koloa, Kauai, T. H.
 B. D. Bond, Act. Asst. Surgeon, U. S. P. H. S., Mahukona, Hawaii, T. H.

FEDERAL OFFICIALS.

WAR DEPARTMENT.

U. S. ARMY.

Engineer Department.

Colonel Thomas H. Rees, Corps of Engineers, U. S. Army, in charge of works for defense of Honolulu and Pearl Harbor, and of the Improvement of Honolulu, Hilo and Kahului Harbor.

Capt. W. H. Britton, Corps of Engrs., Asst. to Dist. Engr. Officer.

S. F. Burbank, Richard Quinn, Assistant Engineers.

A. K. Shepard, Chief Clerk.

F. M. Bechtel, J. M. Byrne, Geo. K. Mills, Daniel S. Pahu, Clerks.

A. V. Hayes, Receiver of Materials.

Harry Kauhane, Inspector.

Geo. M. Fraser, Storekeeper.

S. H. Ware, Superintendent.

NAVY DEPARTMENT.

U. S. Naval Station, Pearl Harbor, T. H. Capt. George R. Clark, U.S.N., Comdt. Lieut. J. M. Ashley, U.S.N., District Communication Supt.

Asst. Engr. R. E. Carney, U.S.N. (Ret.), Engr. and Ordnance Officer. Medical Director T. A. Berryhill, U.S. N., Commanding Hospital.

Pay Inspector W. T. Gray, U.S.N., Supply Officer.

Pay Inspector George P. Dyer, U.S.N., Disbursing Officer.

Civil Engr. C. W. Parks, U.S.N., Public Works Officer.

Asst. Civil Engr. R. L. Martin, U.S.N.

Asst. Naval Const. (T) E. L. Kempton, U.S.N., Construction Officer.

Asst. Surgeon T. C. Anderson, U.S.N.

Asst. Surgeon D. Corey, U.S.N.

Asst. Surg. H. B. Lehmberg, U.S.N.

Asst. Paym. (T) O. J. Phillips, U.S.N.

Asst. Paym. (T) C. H. Breyer, U.S.N.

Ensign (T) E. R. Peircey, U.S.N. (Navajo).

Ehsign (T) F. R. Kalde, U.S.N.

Ensign (T) J. H. MacDonald, U.S.N.

Ensign (T) A. Prastka, U.S.N., Radio Officer.

Pharmacist T. B. Weaver, U.S.N.

Pay Clerk (T) C. F. Howse, U.S.N. Aide to Commandant.

Machinist Geo. H. Paul, F.N.R.

Asst. Surg. A. E. Nichols, USNRF (Dentist).

Boatswain Louis Rassler, USN. (Navajo).

Gunner R. A. Talmage, USN. (High Power Station).

Pay Clerk C. S. Baker, USN. (Disbursing Office).

Pharmacist Q. C. Tucker, USN. (Hospital).

Pay Clerk W. A. Anderson, USNRF (Accounting Office).

OFFICE OF NAVAL CENSOR,
HONOLULUCommodore D. H. Mahan, U. S. Navy,
retired.

Lieut.-Comdr. W. H. Stroud, NNV.

Lieut. F. E. Ferris, USNRF.

Lieut. (j.g.) J. F. Bowes, USNRF.

Lieut. (j.g.) F. G. W. Cooper, USNRF.

LIGHT-HOUSE ESTABLISHMENT.

Arthur E. Arledge, Inspector of the 19th
Lighthouse District, in charge of all
light-house affairs in the Hawaiian
Islands.Frank C. Palmer.....Superintendent
Fredk. A. Edgecomb.....Asst. Supt.
J. A. Malone.....Chief Clerk
C. H. Norton, Thos. Wood.....Clerks
C. E. Sherman.....Foreman
C. F. Finkboner.....
.....Keeper, Light House Depot
Light-House Tender Columbine.

F. T. Warriner, Captain.

H. T. Martin, First Officer.

W. Williams, Second Officer.

A. P. Lederer, Chief Engineer.

WAR DEPARTMENT, U. S. ARMY.

HAWAIIAN DEPARTMENT.

Headquarters — Honolulu, Alexander
Young Building.Commander—Brigadier General John P.
Wisser, U.S.A.Aide-de-Camp—1st Lt. Frank P. Tuohy,
32d Inf'ty.

DEPARTMENT STAFF.

Chief of Staff: Maj. Henry C. Mer-
riam, C.A.C.Adjutant: Maj. L. W. Redington (act-
ing).Inspector: Col. Chas. G. Woodward
(retired).Judge Advocate: Maj. Ingram M. Stain-
back, Nat'l. Guard, U. S.

Quartermaster: Lt.-Col. Richmond
McA. Schofield, Q.M.C.
Surgeon: Col. Rudolph G. Ebert, M.C.
Engineer: Capt. William H. Britton,
C. of E.
Ordnance Officer: Major Charles G.
Mettler, O.D.
Sanitary Inspector: Col. Wm. P. Ken-
dall, M.C.
Officer in Charge of Militia Affairs:
Capt. Louis D. Pepin, C.A.C.

ADDITIONAL STAFF

Lt.-Col. R. McA. Schofield, Q.M.C.,
Constructing Quartermaster.
Capt. John N. Smith, Jr., 1st Inf., Dept.
Casual Officer.
Major Robert H. Duenner, Attd. Sgn.
Capt. Wm. T. Peyton, Sig. Officers' Res.
Corps, Signal Officer.
Capt. Nelson H. Duval, E.O.R.C., Asst.
to Dept. Engr.
Capt. J. M. Riggs, Q.M., O.R.C., Asst.
to D.Q.M.
Capt. Dani. H. Ginty, Q.M.C., Asst.
to D.Q.M.
Capt. Chas. L. Willard, Q.M.C., Asst.
to D.Q.M.
Capt. George L. Converse, Jr., 4th Cav.,
Asst. to Dept. O. O.
1st Lt. Walter L. Reesman, Dental Sgn.
1st Lt. Stephen tH. MacGregor, O.D.,
Ass. to D.O.O.
2nd Lt. Will T. Taber, Q.M.C., Asst.
to D.Q.M.
2nd Lt. Frank H. Richey, Q.M.C., Asst.
to D.Q.M.
2nd Lt. William A. MacNicoll, Q.M.C.
Asst. to D.Q.M.

HAWAIIAN ORDNANCE DEPOT

Commander: Major. Chas. G. Mettler,
O.D.
Assistant: 1st Lt. Stephen H. MacGreg-
or, O.D.
Assistant: Capt. George L. Converse,
Jr., 4th Cav.

THE HAWAIIAN ANNOUNCEMENT —

The recognized reference book of Hawaii, issued each De-
cember for the following year, devoted to Statistics, Re-
search and general information relating to Hawaii. Back
numbers for their special research articles are in constant
demand. While full files from 1875 are now but rarely ob-
tainable, sets from 1884 can be supplied to order on short
notice.

Thos. G. Thrums, Publisher, or *Thrums's, Ltd.*, Honolulu.
Agent.

INDEX

Page		Page	
Annual Sugar Exports, from 1901—Quantity and Value	26	Early Days in the Reign of Kam. IV.	63
Algae of the Hawaiian Archi- pelago	129	Eclipses for 1918	6
Area, Elevation and Coast Line Distance, Hawn. Islands	15	Exports—See Customs Statis- tics.	
Assessed Values Real and Per- sonal Property, 1917	28	Expenditures, Receipts and Pub- lic Debt, 1901-1917	27
Births and Deaths by National- ties and Counties, 1917	19	Federal Officials	197
Bonded Debt, Terr. of Hawaii	27	Hawaii in War Time	51
Calendar, Counting House	2	Hawaiian Pineapple Industry	36
—Quarterly	7	—Volcano Observations	110
Capacity (Seating) Principal Honolulu Halls, Churches, etc.	15	Hawaiian Corporations, Num- ber and Capital, 1917	29
Census Returns, 1910	16	—Sugar Export Statistics	26
—Latest by Islands	16	Hawaii's Agricultural Strength and Weakness	47
Child Welfare Movement	89	Hawaii's Annual Trade Balance	27
Church Days and Holidays	6	Hibiscus Development in Ha- waii	86
Coast Line Distances, etc.	15	—Bonded Debt, 1917	27
Collected Taxes, 1917	29	—Sugar Crops, 1912-1917	182
Commercial Review, 1917	33	Imports—See Customs Statis- tics.	
Comparative Population by Dis- tricts and Islands, 1900-1910	17	Insurance Business, 1916	25
—Table Census Periods, 1860- 1910	17	Interesting Phenomena, 1918	179
County Officials	197	Illiterates in Population, Terr. of Hawaii, 1910	18
Customs Statistics, 1917— Exports and Imports	24	Kona Conditions	83
Import Values from U. S.—	22	Meteorological Observations, Ho- nolulu, 1916-17	32
Shipments to U. S., Domestic, 1916-1917	21	Mo'e Maui Heiau Sites	125
Quantity and Value Domestic Produce to the U. S., 1917	24	Must We Countenance the Hula	120
Death, Lying-in-State of Queen Liliuokalani	102	Nationality of Plantation La- bor, 1916-1917	10
Debt, Bonded, Terr. of Hawaii, 1917	27	—of School Teachers	17
Dimensions Haleakala, Iao Val- ley	9	New Lava Terms	176
—Kilauea, Mokuaweoweo	7	Number and Tonnage Vessels, all Hawn. Ports, 1917	25
Distances, Channel and Ocean	11	Ocean and Channel Distances	11
—Inter-Island, by Sea	11	Overland Distances, Hawaii and Oahu	12
—Overland, Hawaii, Oahu	13	—Kauai and Maui	14
— — Kauai, Maui	14	—Molokai	15
— — Molokai	15		
— — Oahu Railway	15		

Page	Page
Passengers from and to Hawaii, 1917 ----- 27	Musical Treats ----- 174
Passing of Kamehameha I (The) ----- 94	Necrology ----- 175
Pineapple Industry in Hawaii ----- 36	New Enterprises ----- 169
Place Names, Some, Meaning of ----- 177	New Radio Station ----- 176
Plantation Memories, Some ----- 74	Plantation Notes ----- 170
Plantation Mills and Agencies ----- 180	Political ----- 157
Population of Hawaii, Census of 1910 ----- 16	Public Improvements ----- 159
-----Estimated, 1917 ----- 18	Realty Conditions ----- 163
Populations of Honolulu and Hilo ----- 17	Registration and Draft ----- 166
-----By Age, Sex and Race ----- 16	Resignations ----- 175
-----By Race and Sex ----- 17	Shipping Matters ----- 168
Public Debt, etc., Terr. of Hawaii ----- 27	Summarized Conditions ----- 155
Rainfall, Principal Stations Hawn. Islands, 1916-17 ----- 30	Volcano Changes ----- 171
Receipts, Expenditures and Public Debt of Hawaii, 1901-17 ----- 27	Weather ----- 156
Red Cross in Hawaii (The) ----- 59	
Register and Directory, County Officials ----- 197	
-----Federal Officials ----- 197	Seating Capacity Principal Honolulu Churches, Halls, etc. --- 15
-----Territorial Officials ----- 184	School Statistics, Territory of Hawaii, 1917 ----- 29
Retrospect for 1907 ----- 155	Sowing Seeds of Wage Discontent ----- 128
Art Exhibit ----- 176	Statistics — See also Census and Customs Tables. -----
Building Notes ----- 164	-----Births and Deaths by Nationalities, etc. ----- 19
Carnival Season ----- 161	-----Hawn. Sugar Exports from 1901 ----- 26
Congressional Visitors ----- 174	-----Vital, 1917 ----- 19
Fanatical ----- 173	Sugar Plantations, Mills, etc., List of ----- 180
Financial Campaigns ----- 157	Summary of Insurance Business, Hawaii, 1916 ----- 25
Fires ----- 173	-----Meteorological, 1916-17 --- 32
Hawaii's Interned Fleet ----- 160	-----Rainfall Principal Localities, 1916-17 ----- 30
Honolulu Water Supply ----- 170	Taxes by Divisions and Counties, 1917 ----- 29
Improved Stock Imports ----- 172	Territorial Officials ----- 184
Journalistic Enterprise ----- 172	Value of Shipments to the U. S. from Hawaii, 1916-1917--- 21
Kamehameha Day ----- 167	Vital Statistics, 1917, by Islands 19
Landmarks Gone ----- 165	Width of Channels ----- 11
Legislative ----- 158	
Marine Casualties ----- 167	
Miscellanea ----- 176	

THE
First Trust Co., of Hilo
LTD.

HEADQUARTERS FOR IMPROVED AND UNIMPROVE
REAL ESTATE IN THE
Volcano District
on the
Island of Hawaii

The "Vacation Island" of the Hawaiian archipelago. Here is Halemaumau, the lake of living fire, the natural phenome which serves as magnet to attract thousands of tourists annually.

Home Office: Hilo, Hawaii.
Branches: Kohala, Kona and Hamakua.
Cable Address: HILOTRUST.

THE VON HAMM-YOUNG Co., LTD.
*Importers, Commission and Machinery Merchants
Dealers in Automobiles and Automobile Supplies*

AGENTS FOR

Alexander Young Building Co., Ltd.	American Blower Co. (Fan Ventilating Apparatus)
Territorial Hotel Co., Ltd.	Armstrong Cork Co.
Palatine Ins. Co. of London	L. C. Smith Co. (Concrete chinery)
Phoenix Assurance Co. of London	Troy Laundry Machinery Co.
Automobile Department of Hartford Fire Ins. Co.	Clyde Iron Works (Hoist Machinery)
Union Gas Engine Co.	Western Electric Co. (Electric Apparatus and Lamps)
Otis Elevator Company	
Frick Co. (Ice Machinery)	

ALSO AGENTS FOR

Packard Motor Car Co.	Dodge Bros. Cars
Cadillac Motor Car Co.	Denby Trucks
Buick Motor Company	Menominee Trucks
Goodyear Tires	United States Tires

Michelin Tires

THE ALEXANDER YOUNG BUILDING
CORNER KING AND BISHOP STREETS — HONOLULU



THE UNIVERSITY OF MICHIGAN

DATE DUE

DEC 26, 1997
SER 1
12345

UNIV. OF MICH.

MAY 14 1924

BOUND

UNIVERSITY OF MICHIGAN



3 9015 04078 2768

